Issued November 18, 1910.

U. S. DEPARTMENT OF AGRICULTURE.

BUREAU OF STATISTICS—BULLETIN 81.

VICTOR H. OLMSTED, Chief of Bureau.

GRAIN MOVEMENT IN THE GREAT LAKES REGION.

BY

FRANK ANDREWS,

STATISTICAL SCIENTIST, DIVISION OF PRODUCTION AND DISTRIBUTION.

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
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LETTER OF TRANSMITTAL.

U. S. Department of Agriculture,
Bureau of Statistics,
Washington, D. C., May 7, 1910.

Sir: I have the honor to transmit herewith a report on the grain movement in the region of the Great Lakes, prepared by Frank Andrews, Statistical Scientist of the Division of Production and Distribution of this Bureau. Much of the information was obtained by personal inquiry at points from which shipments are made and at which they are received, and by personal application to railroad and steamship officials. The facts gathered in this investigation have not been embraced in any report made by this Department or by any other Government Department, and the information should be serviceable to persons concerned or interested in the marketing of grain.

It is respectfully recommended that this report be published as Bulletin 81 of this Bureau.

Very respectfully,

Victor H. Olmsted,
Chief of Bureau.

Hon. James Wilson,
Secretary of Agriculture.

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GRAIN MOVEMENT IN THE GREAT LAKES REGION.

INTRODUCTION.

A large proportion of the surplus grain crops of the United States has for many years been produced in regions tributary, in a commercial sense, to the traffic of the Great Lakes. This system of inland waterways has afforded transportation facilities which have done much toward giving better and cheaper service in the marketing of grain. It is the purpose of this bulletin to measure statistically the principal features in the marketing of grain in the States which contribute to the traffic carried on these waterways. A review of the past forty years covers many of the most prominent events in the development of cheap and efficient transportation in the region of the Great Lakes, both by water and by rail, hence most of the discussion in this bulletin refers to conditions subsequent to 1870.

HISTORIC SKETCH OF TRANSPORTATION FACILITIES.

Prior to 1871 a number of important events affecting the grain trade of the Great Lakes had occurred which have had an important bearing on its later development. A channel cut through the bar at the mouth of Buffalo Creek in 1819 enabled lake vessels to land at Buffalo. Prior to that time they had anchored offshore, cargo being transferred to and from the town in small boats.

Six years after the dredging of Buffalo Creek the Erie Canal was opened. Facilities were then provided for receiving lake traffic at Buffalo and forwarding it thence to New York by relatively cheap and efficient carriers. Before the opening of the Erie Canal merchandise was carried by stage coaches or wagons between Buffalo and the Hudson River Valley. Traffic in grain under such conditions was practically impossible. The enlargement of the original canal, which was 4 feet deep, was begun in 1832, but was not completed until thirty years later, when the depth had reached 7 feet, allowing the passage of boats drawing 6½ feet.

One year prior to the opening of the harbor at Buffalo the steamboat *Walk-in-the-Water* was built, which in 1819 made a trip from Lake Erie to Mackinac with goods for the American Fur Company.

Prior to 1832 Detroit was the western terminus of most of the lake traffic, except that of fur traders and military posts.[a] The Black Hawk war, which broke out in that year, was one means of diffusing knowledge of Illinois and Wisconsin throughout the East, and helped to accelerate the settlement of the country on the west shore of Lake Michigan.

With the settlement of Illinois and Wisconsin came an extension of traffic to Lake Michigan. As early as 1833 an association of owners of lake steamboats was formed. This continued until 1836. Another association was formed, in 1839, of the lines connecting Buffalo and Chicago. The secretary of both associations was Mr. James L. Barton, from whose articles and reports many of these historic references are taken.

The route by lake between Chicago and Buffalo is reported to have formed a link in a popular line of traffic between New Orleans and north Atlantic points. The first part of the journey from New Orleans northward was made by boat on the Mississippi River. In 1841 the fare between Chicago and Buffalo was $20 for cabin and $10 for steerage. Rates were quoted for "light" freight, 75 cents per hundred pounds, and for "heavy" freight, 50 cents per hundred pounds. Freight traffic between Buffalo and Chicago was well under way in the early forties. One of the difficulties in navigation over this new freight route between Buffalo and Chicago was the mud flats near the head of Lake St. Clair. According to a report referring to the year 1846, lighters were used there to relieve boats of some of their freight, thus enabling them to pass with greater safety over the shallow places. The number of lake boats that ran aground on the flats was reported to be large.

Before any work was done to overcome obstructions to navigation there were a number of places between the mouth of the St. Lawrence and the west end of Lake Superior which were either impassable or navigable only for boats of light draft. Four of the most important of these places were the following: St. Marys Falls (Sault Ste. Marie) in the passage between Lakes Superior and Huron; the St. Clair Flats, in Lake St. Clair; the Limekiln Shoals, in the Detroit River; and Niagara Falls, in the Niagara River between Lakes Erie and Ontario. All of these obstacles have been surmounted. Canals have been constructed around St. Marys and Niagara Falls and dredged through the mud of St. Clair Flats, and a channel has been cut through the rocky river bed at Limekiln Shoals. These are a few of the improvements that have been made in the highway of the Great Lakes during the past century.

[a] James L. Barton, in Hunt's Merchants' Magazine, Oct., 1846.

In 1843 Joseph Dart is said to have erected the first grain elevator at the mouth of Buffalo Creek; it had a storage capacity of 55,000 bushels and could transfer 15,000 bushels per day.[a] Sixty-five years later the storage capacity of Buffalo's grain elevators was nearly 25,000,000 bushels.

SUMMARY OF CHANGES IN FORTY YEARS.

At the beginning of the period covered by this bulletin, in 1871, cars and vessels were much smaller than in 1909. The usual carrying capacity of a freight car about 1871 was 20,000 pounds, while in 1908 cars were usually more than three times that size. The average carrying capacity of lake vessels also increased and the form of their construction has been modified, so that the cost of operation compared with the tonnage carried has been reduced.

Freight rates, accordingly, were much less at the end of the period than at the beginning. The average rate on wheat from Chicago to Buffalo by lake had decreased in 1901–1905 to one-fourth that in 1871–1875, while the average all-rail rate from Chicago to New York on grain in 1871–1875 was about two and one-half times the average for 1901–1905. In this comparison the rates are all on a gold basis. Throughout this bulletin values which were given in currency during 1862–1878 in original reports are here reduced to terms of gold.

A number of changes of importance to the grain trade of the Great Lakes region have occurred since 1870. Tolls on the Erie Canal have been abolished. This placed Oswego and Buffalo on an equal footing as far as tolls were concerned in the trade with New York City. During this period, also, tolls on the Welland Canal were abolished, and this canal was thrown open by treaty to United States vessels, as were other Canadian waterways along the Great Lakes. United States waterways were also thrown open along these lakes to the free use of Canadian vessels. The years subsequent to 1870 also witnessed a great increase in railroad facilities in this region.

PRODUCTION OF GRAIN.

ACREAGE.

The area of land in grain in the United States has, compared with the total improved land, undergone relatively little change during the period under consideration.

According to the census the grain land in 1879 was 41.7 per cent of the total improved land; in 1889, 39.2 per cent; and in 1899, 44.5 per cent. In 12 States of the Great Lakes region (Table 1) the area in grain increased from 64,000,000 acres in 1879 to 103,000,000 acres in 1899, while in the former year the grain area was 45.6 per cent

[a] Annual reports of the Buffalo Merchants' Exchange.

and in the latter year 50.9 per cent of the total improved land. In 1899 five of the States, New York, Pennsylvania, Ohio, Michigan, and Wisconsin, had each devoted to grain less than one-half of the total improved land.

Of the 12 States, New York had the smallest percentage of improved land in grain in 1899 and Nebraska the largest. New York's grain acreage equaled 20 per cent of the improved land; in Pennsylvania the percentage was 35.9; Ohio, 42.7; Indiana, 50.8; and Illinois, 60.5 per cent. The same 5 States had, respectively, in grain 3,100,000, 4,700,000, 8,200,000, 8,500,000, and 16,800,000 acres, Illinois having more than twice as many acres in grain as Ohio, and more than Ohio and Indiana together. The acreage of grain in Iowa in 1899, 16,900,000 acres, was larger than that of any other one of the 12 States shown in Table 1.

TABLE 1.—*Acreage of all improved land and of grain in States bordering on the Great Lakes or contributing largely to their traffic, 1879, 1889, and 1899.*[a]

State and calendar year.	Improved land.		
	Total.	In grain.	
	Acres.	*Acres.*	*P. ct.*
New York:			
1879	17,717,862	3,669,834	20.7
1889	16,389,380	3,239,466	19.8
1899	15,599,986	3,125,077	20.0
Pennsylvania:			
1879	13,423,007	4,724,503	35.2
1889	13,210,597	4,448,517	33.7
1899	13,209,183	4,738,194	35.9
Ohio:			
1879	18,081,091	6,857,556	37.9
1889	18,338,824	6,785,280	37.0
1899	19,244,472	8,214,948	42.7
Indiana:			
1879	13,933,738	6,972,291	50.0
1889	15,107,482	7,341,404	48.6
1899	16,680,358	8,471,706	50.8
Illinois:			
1879	26,115,154	14,461,674	55.4
1889	25,669,060	14,191,410	55.3
1899	27,699,219	16,768,976	60.5
Michigan:			
1879	8,296,862	3,389,861	40.9
1889	9,865,350	3,891,686	39.4
1899	11,799,250	4,721,126	40.0
Wisconsin:			
1879	9,162,528	4,327,294	47.2
1889	9,793,931	4,319,002	44.1
1899	11,246,972	5,376,856	47.8
Minnesota:			
1879	7,246,693	4,234,187	58.4
1889	11,127,953	6,297,044	56.6
1899	18,442,585	11,207,026	60.8
Iowa:			
1879	19,866,541	11,490,795	57.8
1889	25,428,899	12,560,860	49.4
1899	29,897,552	16,920,029	56.6
North Dakota:			
1879	[b] 1,150,413	[b] 453,238	[b] 39.4
1889	4,658,015	3,235,345	69.5
1899	9,644,520	5,610,349	58.2
South Dakota:			
1879	(c)	(c)	(c)
1889	6,959,293	3,701,604	53.2
1899	11,285,983	6,211,202	55.0
Nebraska:			
1879	5,504,702	3,502,146	63.6
1889	15,247,705	7,961,969	52.2
1899	18,432,595	12,070,961	65.5
Total, 12 States:			
1879	140,498,591	64,083,379	45.6
1889	171,796,489	77,973,617	45.4
1899	203,182,675	103,436,450	50.9
All other States:			
1879	144,272,451	54,548,400	37.8
1889	185,820,266	62,243,928	33.5
1899	211,315,812	80,937,043	38.3
United States:			
1879	284,771,042	118,631,779	41.7
1889	357,616,755	140,217,545	39.2
1899	414,498,487	184,373,493	44.5

[a] Compiled from United States census returns. [b] Dakota Territory. [c] Included in Dakota Territory.

GRAIN CROP OF THE GREAT LAKES REGION.

The traffic in grain moves toward the east and the crops of New York and Pennsylvania do not contribute to the tonnage carried on the Great Lakes. A statement of the quantity of grain produced in the 10 States of importance which contribute to the grain traffic on the lakes is shown in Table 2. Throughout the thirty-nine years

beginning with 1871 these 10 States produced more than one-half the grain crop of the United States.

TABLE 2.—*Production of grain in the United States and in the 10 principal States which contribute to the grain traffic on the Great Lakes, 1871-1909.*[a]

Grain, and calendar year.	Total United States.	Total 10 States.[b]	
	Bushels.	Bushels.	Per cent of United States.
Barley.			
Average:			
1871-1875.	31,014,098	12,104,000	39.0
1876-1880.	40,169,195	16,358,549	40.7
1881-1885.	51,962,871	26,521,617	51.0
1886-1890.	65,125,064	36,929,110	56.7
1891-1895.	77,055,724	47,556,432	61.7
1896-1900.	64,896,001	36,884,307	56.8
1901-1905.	130,629,663	82,451,989	63.1
1906-1909.	167,388,371	112,364,474	67.1
1906	178,916,484	115,249,898	64.4
1907	153,597,000	100,512,000	65.4
1908	166,756,000	120,117,000	72.0
1909	170,284,000	113,579,000	66.7
Buckwheat.			
Average:			
1871-1875.	8,479,720	1,545,075	18.2
1876-1880.	11,970,031	2,076,314	17.3
1881-1885.	10,383,301	1,416,022	13.6
1886-1890.	11,861,232	2,126,720	17.9
1891-1895.	13,007,205	2,679,723	20.6
1896-1900.	12,294,120	1,804,815	14.7
1901-1905.	14,698,554	1,481,571	10.1
1906-1909.	15,560,984	1,714,292	11.0
1906	14,641,937	1,561,170	10.7
1907	14,290,000	1,779,000	12.4
1908	15,874,000	1,745 000	11.0
1909	17,438,000	1,772,000	10.2
Corn.			
Average:			
1871-1875.	1,037,621,700	537,546,600	51.8
1876-1880.	1,455,988,117	781,772,533	53.7
1881-1885.	1,618,942,485	793,233,574	49.0
1886-1890.	1,742,450,800	850,598,600	48.8
1891-1895.	1,734,404,553	839,138,222	48.4
1896-1900.	2,058,854,841	1,119,084,936	54.4
1901-1905.	2,293,163,920	1,212,483,779	52.9
1906-1909.	2,740,190,773	1,385,698,340	50.6
1906	2,927,416,091	1,527,578,361	52.2
1907	2,592,320,000	1,276,522,000	49.2
1908	2,668,651,000	1,284,815,000	48.1
1909	2,772,376,000	1,453,878,000	52.4
Oats.			
Average:			
1871-1875.	278,503,300	146,193,800	52.5
1876-1880.	384,500,652	201,502,807	52.4
1881-1885.	537,814,202	323,447,676	60.1
1886-1890.	652,124,600	411,478,000	63.1
1891-1895.	704,952,863	461,243,621	65.4
1896-1900.	748,464,912	508,855,595	68.0
Oats—Cont'd.			
Average:			
1901-1905.	871,311,477	627,852,462	72.1
1906-1909.	883,464,130	646,567,942	73.2
1906	964,904,522	713,675,768	74.0
1907	754,443,000	544,515,000	72.2
1908	807,156,000	572,859,000	71.0
1909	1,007,353,000	755,222,000	75.0
Rye.			
Average:			
1871-1875.	15,621,820	5,038,060	32.3
1876-1880.	23,113,596	8,624,039	37.3
1881-1885.	25,823,914	10,458,386	40.5
1886-1890.	25,564,954	11,529,337	45.1
1891-1895.	28,027,807	13,337,237	47.6
1896-1900.	25,063,512	10,836,000	43.2
1901-1905.	29,813,261	15,989,079	53.6
1906-1909.	32,257,708	18,827,764	58.4
1906	33,374,833	19,297,057	57.8
1907	31,566,000	18,143,000	57.5
1908	31,851,000	18,936,000	59.5
1909	32,239,000	18,935,000	58.7
Wheat.			
Average:			
1871-1875.	272,442,580	157,895,000	58.0
1876-1880.	404,195,909	221,697,868	54.8
1881-1885.	435,685,744	246,393,310	56.6
1886-1890.	443,847,400	257,656,800	58.1
1891-1895.	490,246,218	276,907,906	56.5
1896-1900.	540,503,114	272,366,797	50.4
1901-1905.	660,344,813	343,851,939	52.1
1906-1909.	692,784,742	366,317,900	52.9
1906	735,260,970	385,308,602	52.4
1907	634,087,000	329,254,000	51.9
1908	664,602,000	354,979,000	53.4
1909	737,189,000	395,730,000	53.7
All grain.[c]			
Average:			
1871-1875.	1,643,683,218	860,322,535	52.3
1876-1880.	2,319,937,500	1,232,032,110	53.1
1881-1885.	2,680,612,517	1,401,470,585	52.3
1886-1890.	2,940,974,050	1,570,318,567	53.4
1891-1895.	3,047,694,370	1,640,863,141	53.8
1896-1900.	3,450,082,500	1,949,832,450	56.5
1901-1905.	3,999,961,688	2,284,110,819	57.1
1906-1909.	4,531,646,708	2,531,490,712	55.9
1906	4,854,514,837	2,762,670,856	56.9
1907	4,180,303,000	2,270,725,000	54.3
1908	4,354,890,000	2,353,451,000	54.0
1909	4,736,879,000	2,739,116,000	57.8

[a] Compiled from reports of the Bureau of Statistics, United States Department of Agriculture.
[b] Ohio, Indiana, Illinois, Michigan, Wisconsin, Minnesota, Iowa, North Dakota, South Dakota, and Nebraska.
[c] For explanation of totals of all grain see page 15, last paragraph.

AVERAGE PRODUCTION PER CAPITA.

The production of grain in various States of the Great Lakes region, in proportion to population, is shown in Table 3. The production of wheat in North Dakota has increased much more rapidly than the population. In 1882–1885 the wheat crop of Dakota Territory averaged 72.9 bushels per capita, and in 1906–1909 the average for North Dakota was 175.92 bushels. South Dakota's average was, 1906–1909, 90.58 bushels, while Nebraska produced nearly 45 bushels and Minnesota more than 34 bushels per capita. Of the States included in Table 3, the smallest per capita production was in New York, which since 1895 has averaged scarcely more than 1 bushel per capita. The principal corn States of this group are Nebraska, South Dakota, Iowa, Illinois, Indiana, and Ohio, while those leading in the production of oats and barley in 1906–1909 were North Dakota and South Dakota; of rye, Michigan and Wisconsin; and of buckwheat, New York and Pennsylvania.

TABLE 3.—*Production of grain per capita in States bordering on the Great Lakes or contributing largely to their traffic, 1871–1909.*[a]

State and calendar year.	Barley.	Buckwheat.	Corn.	Oats.	Rye.	Wheat.
New York.						
Average:	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*
1871–1875..	1.46	0.67	3.96	6.89	0.45	1.64
1876–1880..	1.30	.96	4.83	8.62	.66	2.43
1881–1885..	1.55	.67	3.88	7.47	.51	2.03
1886–1890..	1.22	.77	3.66	5.98	.48	1.68
1891–1895..	.94	.75	2.71	5.85	.56	1.24
1896–1900..	.62	.60	2.33	6.40	.54	1.01
1901–1905..	.34	.82	2.32	5.52	.32	1.08
1906–1909..	.25	.80	2.65	4.63	.29	1.01
1906...........	.28	.76	2.83	5.01	.30	1.16
1907...........	.24	.70	1.99	4.55	.26	.88
1908...........	.24	.82	2.93	4.54	.29	.94
1909...........	.23	.89	2.87	4.44	.32	1.05
Pennsylvania.						
Average:						
1871–1875..	.12	.57	10.66	8.13	.86	4.18
1876–1880..	.14	.75	11.03	8.79	.93	5.01
1881–1885..	.12	.68	8.98	7.91	.85	4.08
1886–1890..	.09	.66	8.30	6.45	.80	3.30
1891–1895..	.06	.65	7.24	5.63	.82	3.51
1896–1900..	.03	.71	7.07	5.65	.74	3.72
1901–1905..	.03	.68	7.85	5.51	.88	3.90
1906–1909..	.03	.71	7.41	4.05	.81	4.05
1906...........	.03	.69	8.37	4.59	.87	4.20
1907...........	.03	.66	6.53	4.22	.82	4.28
1908...........	.03	.70	8.02	3.84	.79	4.12
1909...........	.03	.78	6.74	3.58	.76	3.63

State and calendar year.	Barley.	Buckwheat.	Corn.	Oats.	Rye.	Wheat.
Ohio.						
Average:	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*
1871–1875..	0.49	0.09	32.61	8.26	0.13	7.00
1876–1880..	.32	.11	35.34	8.87	.25	10.82
1881–1885..	.30	.06	26.58	8.01	.10	10.16
1886–1890..	.22	.04	23.36	8.52	.21	9.61
1891–1895..	.23	.05	21.33	7.47	.25	10.64
1896–1900..	.15	.05	27.07	8.05	.16	7.41
1901–1905..	.18	.03	23.33	9.30	.06	6.88
1906–1909..	.17	.06	30.36	9.93	.20	7.23
1906...........	.15	.06	31.84	10.88	.23	9.71
1907...........	.17	.06	26.16	8.11	.18	6.82
1908...........	.18	.05	30.07	8.48	.18	7.33
1909...........	.18	.07	33.32	12.24	.21	5.12
Indiana.						
Average:						
1871–1875..	.25	.09	45.45	7.45	.22	11.30
1876–1880..	[b].24	[b].07	59.14	7.63	.24	17.85
1881–1885..	.18	.04	50.87	10.26	.13	16.22
1886–1890..	.15	.04	47.58	12.41	.29	16.38
1891–1895..	.08	.04	46.35	12.58	.38	16.79
1896–1900..	.05	.04	54.45	14.62	.23	10.08
1901–1905..	.11	.03	56.03	15.87	.19	10.66
1906–1909..	.08	.03	62.07	16.06	.36	14.49
1906...........	.09	.03	67.84	18.52	.41	17.74
1907...........	.07	.02	61.55	13.37	.35	12.40
1908...........	.07	.04	49.66	12.76	.34	16.27
1909...........	.07	.04	69.18	19.54	.34	11.66

[a] Compiled from reports of the Bureau of Statistics, United States Department of Agriculture.
[b] Average for 1876 and 1878–1880.

TABLE 3.—*Production of grain per capita in States bordering on the Great Lakes or contributing largely to their traffic, 1871–1909*—Continued.

State and calendar year.	Barley.	Buckwheat.	Corn.	Oats.	Rye.	Wheat.
Illinois.						
Average:	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*
1871–1875..	1.03	0.05	72.43	16.57	0.82	10.06
1876–1880..	.58	.06	84.95	18.46	1.01	13.06
1881–1885..	.28	.05	65.19	28.71	1.31	8.74
1886–1890..	.25	.03	58.51	30.79	.74	8.39
1891–1895..	.18	.02	47.76	21.95	.50	6.37
1896–1900..	.08	.02	53.17	22.78	.27	3.90
1901–1905..	.12	.01	60.99	24.01	.26	5.11
1906–1909..	.14	.01	60.99	20.78	.21	6.30
1906	.14	.01	64.07	19.89	.20	7.11
1907	.11	.01	62.11	18.43	.20	7.27
1908	.15	.02	53.16	16.79	.22	5.38
1909	.15	.01	64.68	27.82	.22	5.51
Michigan.						
Average:						
1871–1875..	.46	.33	12.66	7.23	.18	11.90
1876–1880..	.72	.41	17.99	9.14	.17	16.41
1881–1885..	.67	.24	14.86	11.06	.14	15.74
1886–1890..	.77	.31	12.48	12.32	.48	11.61
1891–1895..	.80	.35	12.00	11.77	.78	9.99
1896–1900..	.44	.17	14.43	12.32	.54	8.16
1901–1905..	.38	.22	16.17	13.24	.89	5.86
1906–1909..	.63	.29	22.70	14.95	2.10	5.31
1906	.70	.26	20.85	16.72	2.22	5.21
1907	.56	.32	21.58	11.52	2.06	4.80
1908	.67	.28	22.52	15.60	2.13	5.86
1909	.61	.31	25.76	15.95	2.00	5.37
Wisconsin.						
Average:						
1871–1875..	1.40	.32	15.81	16.26	1.08	19.54
1876–1880..	3.16	.39	26.32	23.99	2.01	15.38
1881–1885..	4.73	.23	20.15	28.00	1.66	13.52
1886–1890..	6.10	.37	18.41	25.91	1.93	8.89
1891–1895..	6.62	.46	14.99	29.62	2.22	5.37
1896–1900..	3.84	.27	19.97	32.27	1.70	5.54
1901–1905..	6.69	.18	20.77	39.11	2.41	3.76
1906–1909..	9.55	.12	22.02	31.50	2.05	1.54
1906	9.74	.14	26.20	39.94	1.98	2.04
1907	7.90	.14	20.02	22.17	2.04	1.27
1908	10.44	.13	20.96	30.84	2.21	1.40
1909	10.07	.09	21.01	33.15	1.96	1.45
Minnesota.						
Average:						
1871–1875..	1.87	.09	14.10	20.14	.22	41.26
1876–1880..	3.25	.12	19.34	23.94	.23	42.22
1881–1885..	7.42	.06	20.18	33.89	.43	38.06
1886–1890..	6.89	.13	16.89	36.15	.53	31.87
1891–1895..	8.04	.20	17.44	36.88	.85	31.97
1896–1900..	5.43	.12	18.49	29.92	.65	36.63
1901–1905..	14.50	.04	21.89	40.63	.96	39.42
1906–1909..	14.69	.04	23.94	34.01	.87	34.34
1906	15.67	.03	24.87	35.72	.85	27.68
1907	12.94	.04	21.17	30.09	.79	32.81
1908	15.44	.04	22.26	28.04	.77	32.58
1909	14.72	.04	27.37	42.06	1.06	43.83
Iowa.						
Average:	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*
1871–1875..	3.00	0.10	87.96	17.93	0.34	20.98
1876–1880..	3.17	[a].10	119.49	24.54	[a].41	19.74
1881–1885..	2.66	.11	118.48	37.04	.87	15.53
1886–1890..	4.19	.15	134.06	42.15	.80	13.33
1891–1895..	5.74	.14	117.80	57.11	.67	6.57
1896–1900..	4.82	.10	124.07	54.46	.69	8.01
1901–1905..	5.37	.05	117.31	50.23	.50	6.31
1906–1909..	5.42	.05	121.91	47.56	.39	3.23
1906	6.41	.04	152.01	57.33	.40	3.75
1907	5.70	.05	108.63	43.78	.38	3.08
1908	5.36	.06	114.09	43.84	.42	3.20
1909	4.27	.05	113.58	45.50	.37	2.92
North Dakota.[b]						
Average:						
1882–1885..	6.06	.02	36.40	35.26	.51	72.90
1886–1890..	10.99	.09	37.77	64.31	.34	93.16
1891–1895..	21.51	.01	2.28	63.72	.13	181.52
1896–1900..	14.73	.....	1.91	42.24	.27	121.83
1901–1905..	40.51	.04	5.41	85.27	1.13	171.64
1906–1909..	42.45	.....	10.33	91.79	1.04	175.92
1906	39.93	.....	10.53	102.23	1.10	196.69
1907	38.27	.....	7.5[illegible]	79.10	.93	134.84
1908	43.47	.....	9.14	77.64	1.02	162.28
1909	47.70	.....	13.91	107.94	1.10	208.89
South Dakota.[c]						
Average:						
1891–1895..	7.07	.....	40.14	45.25	.23	69.79
1896–1900..	6.10	.....	74.45	38.73	.10	76.19
1901–1905..	21.99	.04	94.26	60.77	1.49	104.72
1906–1909..	49.59	.....	131.96	87.26	1.33	90.58
1906	52.87	.....	144.95	107.10	1.44	96.82
1907	45.88	.....	107.55	74.61	1.35	74.05
1908	55.39	.....	129.92	70.72	1.26	85.29
1909	44.32	.....	145.29	96.83	1.29	105.93
Nebraska.						
Average:						
1871–1875..	1.48	[d].11	48.07	10.47	.12	13.52
1876–1880..	2.25	[e].08	124.28	13.85	[f]1.96	25.77
1881–1885..	5.01	[e].03	155.81	26.45	1.39	33.98
1886–1890..	2.91	.09	116.97	26.83	1.17	17.22
1891–1895..	1.33	.12	116.87	32.97	.95	12.78
1896–1900..	.84	.08	212.74	43.42	.94	23.86
1901–1905..	1.62	.01	198.34	51.90	2.29	40.54
1906–1909..	2.62	.01	193.87	56.52	1.44	44.94
1906	3.14	.01	233.77	67.64	1.87	48.94
1907	2.26	.01	167.78	48.17	1.41	42.95
1908	2.59	.02	192.45	52.45	1.27	41.43
1909	2.47	.01	181.49	57.82	1.23	46.44

[a] Average for 1876 and 1878–1880.
[b] In 1882–1890 includes all Dakota Territory.
[c] In 1882–1890 included in "North Dakota" (Dakota Territory).
[d] Average for 1871–1873 and 1875.
[e] Average for 1878–1880.
[f] Average for 1876 and 1878–1880.

QUANTITY MARKETED.

The surplus production of corn, wheat, and oats is indicated roughly by the quantity shipped out of counties where grown, as shown in Table 4. During the fourteen years covered by Table 4 there were shipped out of the counties where grown, in the 10 States which contribute largely to the grain traffic of the Great Lakes, about 57 per cent of the total marketings of wheat in the United States, 72 per cent of the corn, and 86 per cent of the oats marketed. Corresponding statistics for other crops are not available.

TABLE 4.—*Quantity of wheat, corn, and oats marketed (shipped out of the county where grown) in the United States and in 10 States contributing largely to the grain traffic on the Great Lakes, 1896–1909.*[a]

Grain and calendar year.	Total United States.	Total ten States[b] in Great Lakes region.	
Corn.	*Bushels.*	*Bushels.*	*Per cent.*
Average:			
1896–1900	451,478,738	330,508,641	73.2
1901–1905	472,711,956	340,268,489	72.0
1906–1909	588,938,192	418,735,218	71.1
1896	623,255,914	464,307,293	74.5
1897	411,617,337	296,010,116	71.9
1898	396,005,302	286,183,026	72.3
1899	348,097,934	234,545,774	67.4
1900	478,417,202	371,496,995	77.7
1901	153,213,393	126,045,945	82.3
1902	557,295,588	371,949,567	66.7
1903	419,877,256	286,765,066	68.3
1904	551,634,734	418,795,681	75.9
1905	681,538,811	497,786,185	73.0
1906	679,543,770	489,126,871	72.0
1907	467,675,000	311,433,000	66.6
1908	568,129,000	386,212,000	68.0
1909	640,405,000	488,169,000	76.2
Wheat.			
Average:			
1896–1900	295,125,269	161,676,227	54.8
1901–1905	367,543,353	207,253,058	56.4
1906–1909	406,427,956	235,811,085	58.0
1896	221,226,077	128,392,888	58.0
1897	269,125,950	141,818,412	52.7
1898	398,882,132	253,857,352	63.6
1899	305,019,752	185,871,817	60.9
1900	281,372,432	98,440,668	35.0
Wheat—Cont'd.	*Bushels.*	*Bushels.*	*Percent.*
1901	372,717,482	186,937,945	50.2
1902	388,553,527	245,620,001	63.2
1903	369,582,320	201,389,773	54.5
1904	302,771,219	158,482,085	52.3
1905	404,092,217	243,835,486	60.3
1906	427,252,826	248,348,339	58.1
1907	367,607,000	207,803,000	56.5
1908	393,435,000	229,304,000	58.3
1909	437,417,000	257,789,000	58.9
Oats.			
Average:			
1896–1900	210,836,431	181,384,304	86.0
1901–1905	232,983,691	200,596,864	86.1
1906–1909	262,811,298	222,673,993	84.7
1896	190,642,860	162,425,227	85.2
1897	204,147,306	169,275,261	82.9
1898	193,527,426	167,457,150	86.5
1899	223,014,086	197,333,412	88.5
1900	242,850,477	210,430,469	86.7
1901	143,398,317	129,336,878	90.2
1902	258,438,248	218,793,751	84.7
1903	223,959,467	185,768,487	82.9
1904	261,989,446	229,725,031	87.7
1905	277,132,976	239,360,172	86.4
1906	266,182,194	229,372,972	86.2
1907	210,923,000	177,868,000	84.3
1908	244,444,000	201,087,000	82.3
1909	329,696,000	282,368,000	85.6

[a] Compiled from reports of the Bureau of Statistics, United States Department of Agriculture.
[b] Ohio, Indiana, Illinois, Michigan, Wisconsin, Minnesota, Iowa, North Dakota, South Dakota, and Nebraska.

DOMESTIC TRADE MOVEMENT.

METHOD OF USING COMMERCIAL STATISTICS.

The original data from which Tables 5 to 29 and 47 to 51, inclusive, were compiled contain a few discrepancies, practically all of which are of minor importance, and which it is not practicable to explain or correct. In a few instances the total receipts of grain for a given year do not correspond with the sum of the receipts of the various

grains for that year. Discrepancies of this kind are probably the most common. In order to make use of the detailed figures for each grain separately, and also to show quantities of each shipped over various routes, the following method is arbitrarily adopted for overcoming apparent discrepancies:

The detailed figures are assumed to be correct and totals are computed upon them as a basis. In all cases the data used have been carefully revised and it is believed that whatever errors may have been made are too slight to influence materially the statements as presented in this bulletin.

PRINCIPAL GRAIN PORTS.

The relative importance of the leading grain centers along the Great Lakes is indicated roughly by the statistics of receipts and shipments. (Tables 5 and 6.)

It is to be understood that receipts at a given port may include some grain also reported as received at one or more other ports. On the other hand, it will be noted, data for some ports are incomplete. Receipts at Chicago and other western ports appear in part also at Buffalo, while the receipts at Buffalo include only those coming in by lake. Differences occur in the methods followed by various commercial organizations in compiling statistics of receipts and shipments. Figures for one market may include through shipments, which may not be included at another. In general, however, the figures as given represent the approximate relative importance of the ports mentioned in Tables 5 and 6 in the grain trade of the Great Lakes region. In both receipts and shipments Chicago is far in advance of any other of the ports, Duluth-Superior being next as a shipping point, but holding third place as a receiving point. Buffalo, which holds second place as a receiver of grain, obtains its supply principally from other large markets, while Chicago and Duluth-Superior draw their grain largely from country shipping points.

The storage capacity of grain elevators and, to some extent, the grain-carrying capacity of ships and boats are indicated in terms of cubic measure and not of weight; hence, in a discussion of the facilities for storage and transportation of grain it is customary to express totals of different kinds of grain in terms of cubic measurement. For this reason, the total number of bushels of weight of different varieties of grain has been assumed in this bulletin to be identical with Winchester bushels and so inserted in many tables. It is to be understood, therefore, that the total number of bushels of all grain as given in these tables is merely the sum of various units, not of measurement, but of weight, each of which is the legal standard for the Winchester bushel of the grain in question.

TABLE 5.—*Receipts of grain at selected ports on the Great Lakes and St. Lawrence River, 1891–1909.*[a]

Port and calendar year.	Barley.	Corn.	Oats.	Rye.	Wheat.	Total.[b]
Chicago.						
Average:	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*
1891–1895	14,035,375	73,403,075	76,311,192	3,505,990	34,964,892	202,220,524
1896–1900	17,294,070	121,067,183	110,821,698	3,124,294	32,556,390	284,863,635
1901–1905	21,516,884	88,934,346	84,722,044	2,840,365	33,523,953	231,537,592
1906–1909	22,471,978	101,530,140	91,058,978	1,931,483	25,336,680	242,329,259
1906	20,811,432	98,896,563	89,912,881	2,194,875	28,249,475	240,065,226
1907	18,318,253	125,159,932	93,906,776	2,458,590	24,943,690	264,787,241
1908	23,696,615	91,169,147	92,529,017	1,646,118	21,168,442	230,209,339
1909	27,061,614	90,894,920	87,887,238	1,426,350	26,985,112	234,255,234
Buffalo, by lake.						
Average:						
1891–1895	6,750,486	33,733,800	17,454,224	1,800,334	64,232,936	123,971,780
1896–1900	13,523,209	57,945,939	40,928,201	4,403,061	57,536,825	174,337,235
1901–1905	11,524,451	31,407,065	22,632,623	2,122,989	46,181,778	113,868,906
1906–1909	12,339,932	21,065,453	14,697,436	1,017,360	61,786,212	110,906,393
1906	13,681,058	25,976,478	23,951,155	1,243,640	55,544,832	120,397,163
1907	11,264,101	28,477,767	11,272,858	1,313,174	66,658,138	118,986,038
1908	11,649,064	13,779,988	10,455,716	856,944	63,857,080	100,598,792
1909	12,765,503	16,027,578	13,110,014	655,684	61,084,797	103,643,576
Duluth and Superior.						
Average:						
1891–1895	1,090,800	213,000	517,000	124,000	40,357,600	42,302,400
1896–1900	3,488,000	3,419,800	4,025,200	1,478,600	51,914,400	64,326,000
1901–1905	6,662,017	1,049,157	5,369,200	863,527	34,687,786	48,631,687
1906–1909	9,690,653	392,629	5,544,032	645,995	50,904,325	67,177,634
1906	9,705,792	162,452	7,983,389	589,422	41,558,151	59,999,206
1907	9,746,491	149,365	3,633,677	598,691	55,300,838	69,429,062
1908	9,012,722	33,843	5,873,727	842,911	53,890,816	69,654,019
1909	10,297,608	1,224,854	4,685,337	552,954	52,867,496	69,628,249
Milwaukee.						
Average:						
1891–1895	11,416,867	1,354,977	7,275,076	1,357,006	11,331,490	32,735,416
1896–1900	13,061,846	5,670,051	12,068,471	1,710,351	11,119,415	43,630,134
1901–1905	15,573,044	2,900,254	8,035,710	1,223,461	9,689,383	37,421,852
1906–1909	16,043,349	5,603,246	11,202,200	1,245,000	10,115,849	44,209,644
1906	18,313,000	5,915,250	10,410,350	1,200,000	8,752,654	44,591,254
1907	17,075,362	6,635,435	12,505,750	1,401,300	9,844,448	47,462,295
1908	16,115,233	3,872,000	12,984,000	1,329,000	12,995,269	47,295,502
1909	12,669,800	5,990,300	8,908,700	1,049,700	8,871,026	37,489,526
Cleveland.						
Average:						
1896–1900	414,259	6,820,071	6,457,292	531,107	3,075,738	17,298,467
1901–1905	186,118	8,358,499	8,746,134	210,311	2,234,296	19,735,358
1906–1909	364,587	6,314,312	7,776,056	35,849	1,881,182	16,371,986
1906	388,006	8,756,635	9,050,994	7,743	2,833,516	21,036,894
1907	266,474	5,966,357	7,214,477	1,000	1,622,091	15,070,399
1908	273,899	5,079,130	7,242,360	1,001	1,803,385	14,399,775
1909	529,969	5,455,125	7,596,394	133,652	1,265,737	14,980,877
Toledo.						
Average:						
1891–1895	50,000	6,334,000	578,200	748,600	16,593,600	24,304,400
1896–1900	370,000	14,236,400	3,246,200	644,600	12,661,200	31,158,400
1901–1905	498,873	9,166,819	7,565,460	487,594	7,695,396	25,414,142
1906–1909	5,085	4,941,500	5,000,062	193,910	4,517,488	14,658,045
1906	3,740	6,531,200	7,924,150	194,740	4,459,250	19,113,080
1907	5,000	7,438,400	5,019,600	132,700	4,889,500	17,485,200
1908	1,000	5,430,800	3,767,200	266,500	4,457,200	13,922,700
1909	10,600	365,600	3,289,300	181,700	4,264,000	8,111,200

[a] Figures for Buffalo and Oswego, except for 1909, were compiled from annual reports of the Buffalo Chamber of Commerce; Erie and Ogdensburg, and, for 1909, Buffalo and Oswego, from annual reports of the New York Produce Exchange; Milwaukee from annual reports of the Milwaukee Chamber of Commerce; all other ports, from the Monthly Summary of Commerce and Finance of the United States Department of Commerce and Labor.

[b] See page 15, last paragraph.

TABLE 5.—*Receipts of grain at selected ports on the Great Lakes and St. Lawrence River, 1891–1909*—Continued.

Port and calendar year.	Barley.	Corn.	Oats.	Rye.	Wheat.	Total.
Ogdensburg, by lake.						
Average:	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*
1901–1905	25,540	3,107,433	851,261	32,549	863,673	4,880,456
1906–1909		4,109,349	273,130		427,432	4,809,911
1906		4,729,029	681,002		495,000	5,905,031
1907		4,297,780	294,920		492,976	5,085,676
1908		3,820,323	116,600		259,000	4,195,923
1909		3,590,263			462,750	4,053,013
Erie, by lake.						
Average:						
1891–1895	200,771	4,249,614	120,086	297,827	4,402,434	9,270,732
1896–1900	211,696	8,147,357	257,695	681,814	3,143,909	12,442,471
1901–1905	171,852	915,280		98,105	1,208,132	2,393,369
1906–1909	71,738	631,278			2,706,186	3,409,202
1906	11,674	1,495,094			3,791,133	5,297,901
1907		927,912			4,603,550	5,531,462
1908	20,000	52,140			1,961,421	2,033,561
1909	255,276	49,968			468,641	773,885
Oswego, by lake.						
Average:						
1891–1895	847,138	270,538	25	25,818	172,296	1,315,815
1896–1900	226,850	104,800	1,600	6,522	127,453	467,225
1901–1905	428,061		4,087		37,111	469,259
1906–1909	356,357	135,000	38,750	3,188	112,160	645,455
1906	390,582				46,000	436,582
1907	118,045	133,000			151,500	402,545
1908	296,800	112,000		12,750	201,139	622,689
1909	620,000	295,000	155,000		50,000	1,120,000

TABLE 6.—*Shipments of grain from selected ports on the Great Lakes, 1891–1909.*[a]

Port and calendar year.	Barley.	Corn.	Oats.	Rye.	Wheat.	Total.
Chicago.						
Average:	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*
1891–1895	8,711,824	65,219,010	64,089,748	2,787,483	29,705,785	170,513,850
1896–1900	7,270,108	108,643,912	87,076,269	2,629,001	27,617,426	233,236,716
1901–1905	4,650,577	73,235,417	62,269,143	1,952,838	26,398,087	168,506,062
1906–1909	7,435,076	79,318,513	74,940,430	1,400,634	21,791,670	184,886,323
1906	6,924,357	78,974,686	73,718,199	1,532,157	16,788,573	177,937,972
1907	6,196,708	95,770,779	68,897,313	1,887,535	24,314,892	197,067,227
1908	8,063,151	69,692,749	79,857,557	1,279,276	22,579,044	181,471,777
1909	8,556,086	72,835,839	77,288,653	903,569	23,484,171	183,068,318
Buffalo.						
Average:						
1891–1895	4,528,811	31,777,348	16,486,537	1,572,181	59,545,922	113,910,799
1896–1900	11,467,430	57,357,693	40,378,301	4,130,635	55,246,541	168,580,600
1901–1905	8,857,965	30,426,105	21,123,127	1,785,458	39,415,046	101,607,701
1906–1908	4,386,422	19,871,293	14,150,676	828,088	44,500,822	83,737,301
1906	6,581,618	23,311,432	24,605,779	753,063	37,726,256	92,978,148
1907	2,568,869	23,187,287	10,513,380	1,187,950	48,923,302	86,380,788
1908	4,008,778	13,115,160	7,332,868	543,250	46,852,908	71,852,964
Duluth and Superior.						
Average:						
1891–1895	1,088,800	209,000	385,200	104,000	33,264,600	35,051,600
1896–1900	4,288,200	3,275,800	4,008,000	1,454,000	43,631,400	56,657,400
1901–1905	6,547,305	1,196,335	4,664,546	890,421	30,762,422	44,061,029
1906–1909	9,734,555	393,156	6,395,620	670,935	48,223,755	65,418,021
1906	10,206,776	164,480	11,541,934	608,502	39,109,354	61,631,046
1907	9,690,122	149,365	3,770,923	671,152	49,207,734	63,489,296
1908	8,668,774	1,043	5,386,143	845,466	49,665,264	64,566,690
1909	10,372,549	1,257,734	4,883,480	558,619	54,912,669	71,985,051
Milwaukee.						
Average:						
1891–1895	5,779,997	390,557	5,365,068	954,127	2,704,541	15,194,290
1896–1900	6,954,612	4,357,601	10,876,550	1,340,158	3,084,297	26,613,218
1901–1905	7,959,349	2,007,882	6,516,679	713,689	2,411,942	19,609,541
1906–1909	7,586,850	5,217,772	7,911,684	789,149	4,020,171	25,525,626
1906	8,706,945	5,180,278	7,390,451	749,515	2,642,002	24,669,191
1907	7,113,788	6,700,573	9,588,193	858,930	4,403,014	28,664,498
1908	9,318,604	3,030,202	9,051,216	853,140	6,365,357	28,618,519
1909	5,208,061	5,960,035	5,616,877	695,010	2,670,310	20,150,293
Cleveland.						
Average:						
1896–1900	50,732	5,297,138	4,286,223	220,269	1,878,034	11,732,396
1901–1905	16,856	5,125,328	3,899,829	65,346	991,157	10,098,516
1906–1909	15,458	2,029,405	1,909,557	4,843	735,248	4,694,511
1906	46,236	3,837,502	2,351,161	10,374	1,337,918	7,583,191
1907	6,888	1,923,921	2,287,833	3,577	541,601	4,763,820
1908	4,600	1,097,738	1,289,783	....	531,421	2,923,542
1909	4,108	1,258,459	1,709,451	5,421	530,053	3,507,492
Toledo.						
Average:						
1891–1895	14,800	5,889,000	396,200	698,400	13,327,200	20,325,600
1896–1900	313,400	13,201,800	3,078,800	666,200	7,881,600	25,141,800
1901–1905	84,983	7,594,914	6,431,310	285,645	3,920,139	18,316,991
1906–1909	2,690	3,925,215	4,517,395	177,306	1,865,336	10,487,942
1906	1,760	4,629,750	7,361,730	271,355	1,323,752	13,588,347
1907	5,500	5,659,300	4,761,300	102,670	2,265,990	12,794,760
1908	1,000	3,578,900	3,048,500	147,400	2,534,400	9,310,200
1909	2,500	1,832,910	2,898,050	187,800	1,337,200	6,258,460

[a] Figures for Buffalo were compiled from annual reports of the Buffalo Chamber of Commerce; Duluth and Superior, from annual reports of the Duluth Board of Trade; other ports, from the Monthly Summary of Commerce and Finance.

BEGINNING OF CHICAGO'S GRAIN TRADE.

About the first recorded shipments of grain from Chicago were made in the period 1838–1840, and consisted of wheat only; an annual average of less than 5,000 bushels, scarcely more than half a canal-boat load, was shipped during that period. In 1866–1870 shipments of wheat had increased to an annual average of more than 12,000,000 bushels, while the total shipments of flour and grain of all kinds exceeded 58,000,000 bushels a year. (See Table 7.)

TABLE 7.—*Shipments of grain and flour from Chicago, 1838–1870.*[a]

Calendar year.	Grain.					Flour.	Total grain and flour.[b]
	Barley.	Corn.	Oats.	Rye.	Wheat.		
Average:	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*	*Barrels.*	*Bushels.*
1838–1840	....	....	....	....	4,585	....	4,585
1841–1845	....	....	....	....	632,926	4,014	650,989
1846–1850	10,865	304,891	57,821	....	1,682,761	51,593	2,288,506
1851–1855	92,101	4,622,814	1,902,632	31,991	2,176,980	95,926	9,258,185
1856–1860	184,546	8,744,004	1,063.577	59,841	9,325,924	466,184	21,475,720
1861–1865	531,529	23,309,896	8,338,050	761,897	11,660,612	1,488,925	51,302,146
1866–1870	1,453,468	23,631,039	10,387,290	1,114,655	12,145,509	2,088,328	58,129,437

[a] Compiled from annual reports of the Chicago Board of Trade.
[b] Flour reduced to terms of wheat by assuming 1 barrel of flour to be the product of 4½ bushels of wheat.

CHICAGO'S TRAFFIC BY LAKE, RAIL, AND CANAL.

Practically all the grain received at Chicago comes by rail. Wheat, amounting in some years to more than 1,000,000 bushels, but a small fraction of the total, comes by lake. The receipts by canal have declined to practically nothing. During 1871–1875 more than 7 per cent of the total receipts of grain and flour at Chicago were by canal. Most of this consisted of corn and oats. (See Table 8.)

Chicago, as in the case of other primary markets of the Great Lakes region, has since the beginning of its grain trade shipped a large percentage of its grain and flour by lake. This percentage, however, has declined. In 1871–1875, 69 per cent of the grain and flour shipped from Chicago went by lake, while in 1901–1905 the lake shipments were slightly more than 40 per cent of the total.

Canal shipments of grain and flour for the period shown in Table 9 averaged less than 1 per cent. The largest shipments by canal were of wheat, amounting in 1881–1885 to an average of more than 600,000 bushels a year.

TABLE 8.—*Receipts of grain and flour at Chicago by lake, rail, and canal, 1871-1909.*[a]

Article and calendar year.	Lake.		Rail.		Canal.		Total.
	Quantity.	Per cent of total.	Quantity.	Per cent of total.	Quantity.	Per cent of total.	
Barley.							
Average:	*Bushels.*		*Bushels.*		*Bushels.*		*Bushels.*
1871-1875	89,424	2.2	3,914,904	97.8	407	(b)	4,004,735
1876-1880	75,154	1.5	5,045,601	98.5	1,024	(b)	5,121,779
1881-1885	136,016	1.7	7,789,054	98.3			7,925,070
1886-1890	1,276	(b)	13,904,935	100.0			13,906,211
1891-1895	1,285	(b)	14,033,390	100.0	700	(b)	14,035,375
1896-1900	4,960	(b)	17,287,510	100.0	1,600	(b)	17,294,070
1901-1905	20,260	.1	21,496,624	99.9			21,516,884
1906-1909	13,688	.1	22,458,290	99.9			22,471,978
1906			20,811,432	100.0			20,811,432
1907			18,318,253	100.0			18,318,253
1908	14,750	.1	23,681,865	99.9			23,696,615
1909	40,000	.1	27,021,614	99.9			27,061,614
Corn.							
Average:							
1871-1875			32,776,210	85.6	5,527,239	14.4	38,303,449
1876-1880			58,897,471	91.5	5,472,139	8.5	64,369,610
1881-1885	244	(b)	62,471,750	96.3	2,403,753	3.7	64,875,747
1886-1890	130	(b)	70,332,831	97.7	1,658,510	2.3	71,991,471
1891-1895	5,440	(b)	72,225,579	98.4	1,172,056	1.6	73,403,075
1896-1900	2,220	(b)	119,403,070	98.6	1,661,893	1.4	121,067,183
1901-1905	500	(b)	88,250,618	99.2	683,228	.8	88,934,346
1906-1909			101,433,344	99.9	96,796	.1	101,530,140
1906			98,673,079	99.8	223,484	.2	98,896,563
1907			124,996,232	99.9	163,700	.1	125,159,932
1908			91,169,147	100.0			91,169,147
1909			90,894,920	100.0			90,894,920
Oats.							
Average:							
1871-1875	1,001	(b)	13,942,501	93.5	968,001	6.5	14,911,503
1876-1880			16,508,817	96.5	596,690	3.5	17,105,507
1881-1885	483	(b)	32,626,445	98.3	558,634	1.7	33,185,562
1886-1890	3,880	(b)	51,848,899	98.6	740,046	1.4	52,592,825
1891-1895	13,340	(b)	75,674,301	99.2	623,551	.8	76,311,192
1896-1900	800	(b)	110,461,762	99.7	359,136	.3	110,821,698
1901-1905	33,740	(b)	84,633,510	99.9	54,794	.1	84,722,044
1906-1909	500	(b)	91,057,183	100.0	545	(b)	91,058,228
1906			89,910,701	100.0	2,180	(b)	89,912,881
1907			93,906,776	100.0			93,906,776
1908			92,529,017	100.0			92,529,017
1909	2,000	(b)	87,882,238	100.0			87,884,238
Rye.							
Average:							
1871-1875	274	(b)	1,151,920	99.0	12,027	1.0	1,164,221
1876-1880	120	(b)	1,946,312	96.5	70,358	3.5	2,016,790
1881-1885	310	(b)	2,769,884	98.6	40,327	1.4	2,810,521
1886-1890	638	(b)	2,103,582	98.3	36,387	1.7	2,140,607
1891-1895	1,730	(b)	3,491,981	99.6	12,279	.4	3,505,990
1896-1900	20,767	.7	3,101,265	99.2	2,262	.1	3,124,294
1901-1905	65,300	2.3	2,774,795	97.7	270	(b)	2,840,365
1906-1909	5,000	.3	1,925,608	99.7	875	(b)	1,931,483
1906	20,000	.9	2,171,375	98.9	3,500	.2	2,194,875
1907			2,458,590	100.0			2,458,590
1908			1,646,118	100.0			1,646,118
1909			1,426,350	100.0			1,426,350

[a] Compiled from annual reports of the Chicago Board of Trade.
[b] Less than 0.05 of 1 per cent.

TABLE 8.—*Receipts of grain and flour at Chicago by lake, rail, and canal, 1871–1909*—Continued.

Article and calendar year.	Lake.		Rail.		Canal.		Total.
	Quantity.	Per cent of total.	Quantity.	Per cent of total.	Quantity.	Per cent of total.	
Wheat.							
Average:	*Bushels.*		*Bushels.*		*Bushels.*		*Bushels.*
1871–1875	83,992	0.4	21,373,372	99.5	22,906	0.1	21,480,270
1876–1880	177,012	.7	23,425,029	99.2	17,933	.1	23,619,974
1881–1885	103,241	.5	20,568,929	99.4	28,838	.1	20,701,008
1886–1890	87,452	.5	16,855,426	99.1	71,018	.4	17,013,896
1891–1895	390,405	1.1	34,512,217	98.7	62,270	.2	34,964,892
1896–1900	1,386,758	4.3	31,155,500	95.7	14,132	(a)	32,556,390
1901–1905	1,306,731	3.9	32,212,142	96.1	5,080	(a)	33,523,953
1906–1909	2,085,040	8.2	23,251,640	91.8	....	....	25,336,680
1906	785,415	2.8	27,464,060	97.2	....	....	28,249,475
1907	564,000	2.3	24,379,690	97.7	....	....	24,943,690
1908	1,409,100	6.7	19,759,342	93.3	....	....	21,168,442
1909	5,581,646	20.7	21,403,466	79.3	....	....	26,985,112
Wheat flour.							
Average:	*Barrels.*		*Barrels.*		*Barrels.*		*Barrels.*
1871–1875	35,121	1.6	2,086,835	97.3	22,869	1.1	2,144,825
1876–1880	28,177	.9	2,962,542	97.1	61,730	2.0	3,052,449
1881–1885	32,067	.7	4,627,961	97.9	67,025	1.4	4,727,053
1886–1890	16,797	.3	5,058,920	97.6	107,264	2.1	5,182,981
1891–1895	48,582	1.1	4,324,161	96.8	93,062	2.1	4,465,805
1896–1900	51,144	1.0	5,076,548	97.6	72,093	1.4	5,199,785
1901–1905	20,122	.2	8,399,067	99.6	15,190	.2	8,434,379
1906–1909	1,092	(a)	9,121,913	99.9	6,216	.1	9,129,221
1906	3,250	(a)	9,031,217	99.7	24,862	.3	9,059,329
1907	1,120	(a)	9,434,191	100.0	....	....	9,435,311
1908	....	....	9,496,037	100.0	....	....	9,496,037
1909	....	....	8,526,207	100.0	....	....	8,526,207
Total grain and flour. [b]							
Average:	*Bushels.*		*Bushels.*		*Bushels.*		*Bushels.*
1871–1875	332,735	.4	82,549,665	92.2	6,633,490	7.4	89,515,890
1876–1880	379,082	.3	119,154,669	94.6	6,435,929	5.1	125,969,680
1881–1885	384,595	.3	147,051,887	97.5	3,333,164	2.2	150,769,646
1886–1890	168,962	.1	177,810,813	98.3	2,988,649	1.6	180,968,424
1891–1895	630,819	.3	219,396,192	98.7	2,289,635	1.0	222,316,646
1896–1900	1,645,654	.5	304,253,573	98.7	2,363,441	.8	308,262,668
1901–1905	1,517,080	.6	267,163,491	99.1	811,727	.3	269,492,298
1906–1909	2,109,144	.8	281,174,674	99.2	126,186	(a)	283,410,004
1906	820,040	.3	279,671,123	99.6	341,043	.1	280,832,206
1907	569,040	.2	306,513,401	99.7	163,700	.1	307,246,141
1908	1,423,850	.5	271,517,655	99.5	....	....	272,941,505
1909	5,623,646	2.1	266,996,520	97.9	....	....	272,620,166

a Less than 0.05 of 1 per cent.
b Flour reduced to terms of grain by assuming 1 barrel of flour to be the product of 4½ bushels of wheat.

TABLE 9.—*Shipments of grain and flour from Chicago by lake, rail, and canal, 1871–1909.*[a]

Article and calendar year.	Lake.		Rail.		Canal.		Total.
	Quantity.	Per cent of total.	Quantity.	Per cent of total.	Quantity.	Per cent of total.	
Barley.							
Average:	*Bushels.*		*Bushels.*		*Bushels.*		*Bushels.*
1871–1875	985,864	31.6	2,129,977	68.4	....	....	3,115,841
1876–1880	686,328	20.1	2,733,663	79.9	....	....	3,419,991
1881–1885	67,921	1.6	4,078,682	98.4	....	....	4,146,603
1886–1890	618,392	7.7	7,366,185	92.3	....	....	7,984,577
1891–1895	2,485,619	28.5	6,226,205	71.5	....	....	8,711,824
1896–1900	3,123,707	43.0	4,146,401	57.0	....	....	7,270,108
1901–1905	612,408	13.2	4,038,169	86.8	....	....	4,650,577
1906–1909	301,145	4.1	7,133,931	95.9	....	....	7,435,076
1906	786,021	11.4	6,138,336	88.6	....	....	6,924,357
1907	560	(b)	6,196,148	100.0	....	....	6,196,708
1908	202,000	2.5	7,861,151	97.5	....	....	8,063,151
1909	216,000	2.5	8,340,086	97.5	....	....	8,556,086
Corn.							
Average:							
1871–1875	32,474,110	90.4	3,444,474	9.6	8,143	(b)	35,926,727
1876–1880	45,408,527	74.0	15,942,301	26.0	10,661	(b)	61,361,489
1881–1885	36,008,093	58.4	25,545,253	41.4	103,243	0.2	61,656,589
1886–1890	49,576,593	70.6	20,534,866	29.3	49,152	.1	70,160,611
1891–1895	46,392,916	71.1	18,792,344	28.8	33,750	.1	65,219,010
1896–1900	79,632,950	73.3	28,990,352	26.7	20,610	(b)	108,643,912
1901–1905	44,821,523	61.2	28,412,694	38.8	1,200	(b)	73,235,417
1906–1909	35,202,289	44.4	44,116,224	55.6	....	....	79,318,513
1906	43,637,502	55.3	35,337,184	44.7	....	....	78,974,686
1907	46,604,412	48.7	49,166,367	51.3	....	....	95,770,779
1908	23,714,875	34.0	45,977,874	66.0	....	....	69,692,749
1909	26,852,366	36.9	45,983,473	63.1	....	....	72,835,839
Oats.							
Average:							
1871–1875	6,094,935	50.0	6,091,757	50.0	1,653	(b)	12,188,345
1876–1880	3,599,006	24.2	11,271,183	75.7	9,254	.1	14,879,443
1881–1885	4,079,227	14.0	24,968,660	85.9	34,370	.1	29,082,257
1886–1890	14,134,124	30.4	32,278,010	69.5	20,978	.1	46,433,112
1891–1895	18,222,378	28.4	45,863,730	71.6	3,640	(b)	64,089,748
1896–1900	28,655,489	32.9	58,418,220	67.1	2,560	(b)	87,076,269
1901–1905	12,406,150	19.9	49,835,559	80.0	27,434	.1	62,269,143
1906–1909	5,141,113	6.9	69,766,880	93.1	32,437	(b)	74,940,430
1906	6,986,823	9.5	66,601,625	90.3	129,751	.2	73,718,199
1907	4,505,204	6.5	64,392,109	93.5	....	....	68,897,313
1908	4,415,425	5.5	75,442,132	94.5	....	....	79,857,557
1909	4,657,000	6.0	72,631,653	94.0	....	....	77,288,653
Rye.							
Average:							
1871–1875	428,099	57.7	313,612	42.3	80	(b)	741,791
1876–1880	1,103,132	64.0	619,235	36.0	140	(b)	1,722,507
1881–1885	1,242,699	50.5	1,216,540	49.5	535	(b)	2,459,774
1886–1890	624,395	33.4	1,242,557	66.5	1,950	.1	1,868,902
1891–1895	1,427,436	51.2	1,360,047	48.8	....	....	2,787,483
1896–1900	1,925,340	73.2	703,661	26.8	....	....	2,629,001
1901–1905	1,043,003	53.4	909,835	46.6	....	....	1,952,838
1906–1909	316,732	22.6	1,083,902	77.4	....	....	1,400,634
1906	386,992	25.3	1,145,165	74.7	....	....	1,532,157
1907	733,115	38.8	1,154,420	61.2	....	....	1,887,535
1908	101,820	8.0	1,177,456	92.0	....	....	1,279,276
1909	45,000	5.0	858,569	95.0	....	....	903,569
Wheat.							
Average:							
1871–1875	13,903,396	69.3	5,973,718	29.8	190,904	.9	20,068,018
1876–1880	12,990,735	60.5	7,905,571	36.9	560,879	2.6	21,457,185
1881–1885	9,331,066	55.8	6,780,259	40.5	617,832	3.7	16,729,157
1886–1890	10,203,673	61.7	5,765,582	34.8	575,595	3.5	16,544,850
1891–1895	22,519,491	75.8	6,747,274	22.7	439,020	1.5	29,705,785
1896–1900	18,007,875	65.2	9,147,417	33.1	462,134	1.7	27,617,426
1901–1905	16,138,639	61.1	10,037,408	38.0	222,040	.9	26,398,087
1906–1909	10,801,979	49.6	10,949,314	50.2	40,377	.2	21,791,670

[a] Compiled from annual reports of the Chicago Board of Trade. [b] Less than 0.05 of 1 per cent.

TABLE 9.—*Shipments of grain and flour from Chicago by lake, rail, and canal, 1871-1909*—Continued.

Article and calendar year.	Lake.		Rail.		Canal.		Total.
	Quantity.	Per cent of total.	Quantity.	Per cent of total.	Quantity.	Per cent of total.	
Wheat—Continued.	*Bushels.*		*Bushels.*		*Bushels.*		*Bushels.*
1906	9,138,655	54.4	7,488,410	44.6	161,508	1.0	16,788,573
1907	14,368,973	59.1	9,945,919	40.9			24,314,892
1908	10,405,787	46.1	12,173,257	53.9			22,579,044
1909	9,294,500	39.6	14,189,671	60.4			23,484,171
Wheat flour.							
Average:	*Barrels.*		*Barrels.*		*Barrels.*		*Barrels.*
1871-1875	404,784	21.2	1,502,838	78.7	1,194	.1	1,908,816
1876-1880	313,030	11.3	2,455,949	88.7	1,033	(a)	2,770,012
1881-1885	631,802	14.1	3,845,848	85.9	615	(a)	4,478,265
1886-1890	1,643,203	34.6	3,095,315	65.3	4,029	.1	4,742,547
1891-1895	1,597,794	39.7	2,423,235	60.3	946	(a)	4,021,975
1896-1900	940,794	20.1	3,747,424	79.9	87	(a)	4,688,305
1901-1905	1,274,789	18.6	5,573,445	81.4	411	(a)	6,848,645
1906-1909	3,109,762	35.6	5,622,393	64.4			8,732,155
1906	2,609,046	31.8	5,590,582	68.2			8,199,628
1907	3,270,651	35.4	5,961,042	64.6			9,231,693
1908	3,471,515	37.8	5,708,840	62.2			9,180,355
1909	3,087,834	37.1	5,229,109	62.9			8,316,943
Total grain and flour.[b]							
Average:	*Bushels.*		*Bushels.*		*Bushels.*		*Bushels.*
1871-1875	55,707,932	69.1	24,716,309	30.6	206,153	.3	80,630,394
1876-1880	65,196,363	56.5	49,523,724	43.0	585,582	.5	115,305,669
1881-1885	53,572,115	39.9	79,895,710	59.5	758,747	.6	134,226,572
1886-1890	82,551,591	50.2	81,116,118	49.4	665,805	.4	164,333,514
1891-1895	98,237,913	52.1	89,894,158	47.7	480,667	.2	188,612,738
1896-1900	135,578,935	53.3	118,269,458	46.5	485,695	.2	254,334,088
1901-1905	80,758,272	40.5	118,314,169	59.4	252,523	.1	199,324,964
1906-1909	57,341,093	28.7	142,816,605	71.3	72,815	(a)	200,230,513
1906	63,284,133	34.1	121,742,247	65.7	291,259	.2	185,317,639
1907	69,155,849	33.7	136,219,904	66.3			205,375,753
1908	41,964,271	22.1	147,769,826	77.9			189,734,097
1909	54,960,119	24.9	165,534,443	75.1			220,494,562

[a] Less than 0.05 of 1 per cent.
[b] Flour reduced to terms of grain by assuming 1 barrel of flour to be the product of 4½ bushels of wheat.

DESTINATIONS OF CHICAGO SHIPMENTS.

Buffalo is the principal destination of grain shipped by lake from Chicago and other lake ports. In 1901-1905 two-thirds of all grain shipped from Chicago was consigned to Buffalo. Shipments to Ogdensburg increased from about 1,000,000 bushels a year in 1871-1875 to nearly 7,000,000 bushels in 1891-1895, and dropped to less than 5,000,000 in 1901-1905. Meanwhile, shipments of grain from Chicago to Oswego were discontinued. Of the Canadian destinations, the most important for Chicago shipments by lake are the ports on Georgian Bay and neighboring waters. During the ten years ending with 1905 an average of more than 12,000,000 bushels a year was shipped from Chicago to these ports. (See Table 10.)

TABLE 10.—*Shipments of grain from Chicago by lake, 1871–1909, showing principal ports to which consigned.*[a]

Port and calendar year.	Barley.	Corn.	Oats.	Rye.	Wheat.	All grain.
UNITED STATES PORTS.						
Buffalo.						
Average:	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*
1871–1875	838,818	23,826,271	4,764,549	368,629	9,470,859	39,269,126
1876–1880	489,262	33,867,355	2,499,202	1,002,846	10,226,759	48,085,424
1881–1885	56,762	24,848,896	2,442,768	1,161,793	7,007,347	35,517,566
1886–1890	591,370	35,718,589	7,993,981	588,267	8,912,528	53,804,735
1891–1895	2,238,098	31,467,839	13,253,487	874,066	17,370,797	65,204,287
1896–1900	2,856,529	52,246,024	21,972,343	1,412,730	13,172,774	91,660,400
1901–1905	533,265	29,953,352	7,097,693	727,297	11,983,352	50,294,959
1906–1909	252,221	20,347,397	3,553,023	282,534	7,800,364	32,235,539
1906	610,885	24,704,564	3,989,991	332,000	8,044,160	37,681,600
1907	....	27,586,128	2,937,076	708,115	11,837,308	43,068,627
1908	182,000	13,939,757	3,108,025	45,020	6,733,246	24,008,048
1909	216,000	15,159,139	4,177,000	45,000	4,586,740	24,183,879
Erie.						
Average:						
1871–1875	1,600	356,044	231,026	4,800	522,363	1,115,833
1876–1880	26,540	2,787,178	52,000	47,660	849,316	3,762,694
1881–1885	10,964	2,149,175	254,798	44,596	538,113	2,997,646
1886–1890	9,218	2,149,106	143,951	....	158,598	2,460,873
1891–1895	71,836	3,082,201	104,404	140,139	2,485,540	5,884,120
1896–1900	71,661	4,711,253	172,888	172,393	604,792	5,732,987
1901–1905	....	434,100	150	73,115	75,801	583,166
1906–1909	5,000	384,559	....	....	130,561	520,120
1906	....	947,237	....	....	45,000	992,237
1907	....	489,000	....	....	233,243	722,243
1908	20,000	52,000	....	....	190,000	262,000
1909	....	50,000	....	....	54,000	104,000
Ogdensburg.						
Average:						
1871–1875	10,102	1,073,185	70,395	905	119,194	1,273,781
1876–1880	....	1,730,693	73,220	4,735	82,263	1,890,911
1881–1885	....	1,063,627	158,614	....	33,756	1,255,997
1886–1890	....	3,901,353	1,201,357	1,167	46,224	5,150,101
1891–1895	4,070	4,731,844	1,837,041	8,478	301,105	6,882,538
1896–1900	5,000	4,721,582	1,258,404	31,004	423,347	6,439,337
1901–1905	3,000	3,170,863	828,751	31,541	512,522	4,546,677
1906–1909	....	4,098,270	315,900	....	160,480	4,574,650
1906	....	5,067,375	888,002	....	120,277	6,075,654
1907	....	4,338,634	259,000	....	222,645	4,820,279
1908	....	3,398,272	116,600	....	259,000	3,773,872
1909	....	3,588,800	....	....	40,000	3,628,800
Oswego.						
Average:						
1871–1875	61,768	1,291,921	39,484	27,512	495,131	1,915,816
1876–1880	12,535	447,324	....	5,210	63,420	528,489
1881–1885	....	361,989	....	5,167	49,191	416,347
1886–1890	....	88,807	....	....	....	88,807
1891–1909	....	....	....	....	....	....
Other United States ports.						
Average:						
1871–1875	73,076	2,989,946	912,449	15,562	277,902	4,268,935
1876–1880	45,706	2,867,020	636,842	1,985	183,330	3,734,883
1881–1885	195	3,137,167	888,645	18,376	529,927	4,574,310
1886–1890	17,804	1,013,699	1,952,047	....	334,207	3,317,757
1891–1895	171,615	2,679,259	1,717,010	2,046	1,113,448	5,683,378
1896–1900	88,097	5,654,065	1,993,631	176,725	1,491,849	9,404,367
1901–1905	....	2,127,323	266,090	....	536,500	2,929,913
1906–1909	140	1,733,420	582,616	....	129,510	2,445,686
1906	....	2,144,706	107,665	....	418,039	2,670,410
1907	560	2,811,500	552,001	....	100,000	3,464,061
1908	....	1,287,466	1,190,800	....	....	2,478,266
1909	....	690,008	480,000	....	....	1,170,008

[a] Compiled from annual reports of the Chicago Board of Trade.

TABLE 10.—*Shipments of grain from Chicago by lake, 1871-1909, showing principal ports to which consigned*—Continued.

Port and calendar year.	Barley.	Corn.	Oats.	Rye.	Wheat.	All grain.
UNITED STATES PORTS—continued.						
Total United States ports.						
Average:	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*
1871-1875	985,364	29,537,367	6,017,903	417,408	10,885,449	47,843,491
1876-1880	574,043	41,699,570	3,261,264	1,062,436	11,405,088	58,002,401
1881-1885	67,921	31,560,854	3,744,825	1,229,932	8,158,334	44,761,866
1886-1890	618,392	42,871,554	11,291,336	589,434	9,451,557	64,822,273
1891-1895	2,485,619	41,961,143	16,911,942	1,024,729	21,270,890	83,654,323
1896-1900	3,021,287	67,332,924	25,397,266	1,792,852	15,692,762	113,237,091
1901-1905	536,265	35,685,638	8,192,684	831,953	13,108,175	58,354,715
1906-1909	257,361	26,563,646	4,451,540	282,534	8,220,914	39,775,995
1906	610,885	32,863,882	4,985,658	332,000	8,627,476	47,419,901
1907	560	35,225,262	3,748,077	708,115	12,393,196	52,075,210
1908	202,000	18,677,495	4,415,425	45,020	7,182,246	30,522,186
1909	216,000	19,487,947	4,657,000	45,000	4,680,740	29,086,687
CANADIAN PORTS.						
Lake Ontario and St. Lawrence River.						
Average:						
1871-1875	....	1,470,124	....	....	2,175,469	3,645,593
1876-1880	96,203	2,394,236	125,958	7,830	1,162,996	3,787,223
1881-1885	....	1,469,806	8,000	8,752	836,901	2,323,459
1886-1890	....	2,090,418	13,592	21,698	700,908	2,826,616
1891-1895	....	2,887,034	102,204	402,707	1,239,172	4,631,117
1896-1900	42,220	4,651,989	313,946	83,513	687,958	5,779,626
1901-1905	43,583	2,027,106	189,350	5,213	289,671	2,554,923
1906-1909	....	1,795,988	....	12,950	1,103,746	2,912,684
1906	....	2,072,884	....	....	....	2,072,884
1907	....	3,802,257	....	....	755,476	4,557,733
1908	....	566,813	....	51,800	1,593,750	2,212,363
1909	....	742,000	....	....	2,065,760	2,807,760
Georgian Bay, Lake Huron, and St. Clair River.						
Average:						
1871-1880	....	....	....	....	....	....
1881-1885	....	1,873,031	307,517	....	8,150	2,188,698
1886-1890	....	3,913,518	2,746,597	....	....	6,660,115
1891-1895	....	1,469,380	1,208,232	....	9,429	2,687,041
1896-1900	60,200	7,418,830	2,908,197	48,975	1,627,155	12,063,357
1901-1905	32,560	6,675,781	3,291,850	201,437	2,696,421	12,898,049
1906-1909	43,784	5,099,858	439,616	21,248	1,302,093	6,906,599
1906	175,136	7,151,961	1,557,265	54,992	511,179	9,450,533
1907	....	5,565,063	201,200	25,000	929,401	6,720,664
1908	....	2,708,158	....	5,000	1,629,791	4,342,949
1909	....	4,974,250	....	....	2,138,000	7,112,250
Other Canadian ports						
Average:						
1871-1875	500	1,466,619	77,032	10,691	842,478	2,397,320
1876-1880	16,082	1,314,721	211,784	32,866	422,651	1,998,104
1881-1885	....	1,104,402	18,885	4,015	327,681	1,454,983
1886-1890	....	701,103	82,599	13,263	51,208	848,173
1891-1895	....	75,359	....	....	....	75,359
1896-1900	....	229,207	36,080	....	....	265,287
1901-1905	....	432,998	732,266	4,400	44,372	1,214,036
1906-1909	....	1,742,796	249,957	....	175,225	2,167,978
1906	....	1,548,775	443,900	....	....	1,992,675
1907	....	2,011,830	555,927	....	290,900	2,858,657
1908	....	1,762,409	....	....	....	1,762,409
1909	....	1,648,169	....	....	410,000	2,058,169

TABLE 10.—*Shipments of grain from Chicago by lake, 1871–1909, showing principal ports to which consigned*—Continued.

Port and calendar year.	Barley.	Corn.	Oats.	Rye.	Wheat.	All grain.
CANADIAN PORTS—cont'd.						
Total Canadian ports.						
Average:	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*
1871-1875	500	2,936,743	77,032	10,691	3,017,947	6,042,913
1876-1880	112,285	3,708,957	337,742	40,696	1,585,647	5,785,327
1881-1885	....	4,447,239	334,402	12,767	1,172,732	5,967,140
1886-1890	....	6,705,039	2,842,788	34,961	752,116	10,334,904
1891-1895	....	4,431,773	1,310,436	402,707	1,248,601	7,393,517
1896-1900	102,420	12,300,026	3,258,223	132,488	2,315,113	18,108,270
1901-1905	76,143	9,135,885	4,213,466	211,050	3,030,464	16,667,008
1906-1909	43,784	8,638,642	689,573	34,198	2,581,064	11,987,261
1906	175,136	10,773,620	2,001,165	54,992	511,179	13,516,092
1907	....	11,379,150	757,127	25,000	1,975,777	14,137,054
1908	....	5,037,380	....	56,800	3,223,541	8,317,721
1909	....	7,364,419	....	....	4,613,760	11,978,179
TOTAL UNITED STATES AND CANADIAN PORTS.						
Average:						
1871-1875	985,864	32,474,110	6,094,935	428,099	13,903,396	53,886,404
1876-1880	686,328	45,408,527	3,599,006	1,103,132	12,990,735	63,787,728
1881-1885	67,921	36,008,093	4,079,227	1,242,699	9,331,066	50,729,006
1886-1890	618,392	49,576,593	14,134,124	624,395	10,203,673	75,157,177
1891-1895	2,485,619	46,392,916	18.222,378	1,427,436	22,519,491	91,047,840
1896-1900	3,123,707	79,632,950	28,655,489	1,925,340	18,007,875	131,345,361
1901-1905	612,408	44,821,523	12,406,150	1,043,003	16,138,639	75,021,723
1906-1909	301,145	35,202,289	5,141,113	316,732	10,801,979	51,763,258
1906	786,021	43,637,502	6,986,823	386,992	9,138,655	60,935,993
1907	560	46,604,412	4,505,204	733,115	14,368,973	66,212,264
1908	202,000	23,714,875	4,415,425	101,820	10,405,787	38,839,907
1909	216,000	26,852,366	4,657,000	45,000	9,294,500	41,064,866

RECEIPTS AT MILWAUKEE CHIEFLY BY RAIL.

Receipts of grain by lake at Milwaukee are insignificant, as compared with receipts by rail, as shown in Table 11. This condition is common to the large ports—Toledo, Chicago, Milwaukee, Duluth, and Superior—at the western limits of the grain routes. At these places grain, gathered from country shipping points, is made up in large consignments for lake transportation and for railroad shipment also. It is when grain is shipped out that the lake carriers do the most service to the primary markets on the lakes. On the other hand, at the receiving ports, as Buffalo, Erie, Ogdensburg, and Oswego, lake receipts assume a much greater importance when compared with receipts by rail, while shipments by lake from these eastern transfer and milling points are seldom made.

The lake shipments of grain and flour from Milwaukee amounted to 75 per cent of the total shipments in 1871–1875 and slightly more than 42 per cent in 1901–1905. In the statement given in Table 12 the rail shipments include also traffic moved across Lake Michigan in ordinary vessels or in cars carried by ferryboats. This movement, being so closely allied with rail shipments and the distance by water being relatively short, seems to fall more within the class of rail than of strictly lake traffic.

TABLE 11.—*Receipts of grain and flour at Milwaukee by lake and rail, 1871–1909.*[a]

Article and calendar year.	Lake.		Rail.[b]		Total.
	Quantity.	Per cent of total.	Quantity.	Per cent of total.	
Barley.					
Average:	*Bushels.*		*Bushels.*		*Bushels.*
1871–1875	30,959	2.4	1,244,003	97.6	1,274,962
1876–1880	50,080	1.6	3,052,657	98.4	3,102,737
1881–1885	121,836	2.0	5,933,706	98.0	6,055,542
1886–1890	24,052	.3	8,081,952	99.7	8,106,004
1891–1895	5,063	(c)	11,411,804	100.0	11,416,867
1896–1900	26,927	.2	13,034,919	99.8	13,061,846
1901–1905	17,308	.1	15,555,736	99.9	15,573,044
1906–1909	2,574	(c)	16,040,775	100.0	16,043,349
1906	5,500	(c)	18,307,500	100.0	18,313,000
1907	2,962	(c)	17,072,400	100.0	17,075,362
1908	1,833	(c)	16,113,400	100.0	16,115,233
1909	....	....	12,669,800	100.0	12,669,800
Corn.					
Average:					
1871–1875	5,000	.4	1,290,240	99.6	1,295,240
1876–1880	200	(c)	1,239,741	100.0	1,239,941
1881–1885	960	.1	1,353,520	99.9	1,354,480
1886–1890	....	....	977,335	100.0	977,335
1891–1895	5	(c)	1,354,972	100.0	1,354,977
1896–1900	4,396	.1	5,665,655	99.9	5,670,051
1901–1905	134	(c)	2,900,120	100.0	2,900,254
1906–1909	16,359	.3	5,586,887	99.7	5,603,246
1906	....	....	5,915,250	100.0	5,915,250
1907	5,435	.1	6,630,000	99.9	6,635,435
1908	....	....	3,872,000	100.0	3,872,000
1909	60,000	1.0	5,930,300	99.0	5,990,300
Oats.					
Average:					
1871–1875	1,521	.1	1,472,246	99.9	1,473,767
1876–1880	196	(c)	1,813,911	100.0	1,814,107
1881–1885	9,103	.3	2,737,145	99.7	2,746,248
1886–1890	1,250	(c)	3,234,469	100.0	3,235,719
1891–1895	1,248	(c)	7,273,828	100.0	7,275,076
1896–1900	340	(c)	12,068,131	100.0	12,068,471
1901–1905	1,970	(c)	8,033,740	100.0	8,035,710
1906–1909	1,650	(c)	11,200,550	100.0	11,202,200
1906	750	(c)	10,409,600	100.0	10,410,350
1907	4,350	(c)	12,501,400	100.0	12,505,750
1908	....	....	12,984,000	100.0	12,984,000
1909	1,500	(c)	8,907,200	100.0	8,908,700
Rye.					
Average:					
1871–1875	708	.2	352,873	99.8	353,581
1876–1880	624	.1	639,135	99.9	639,759
1881–1885	3,599	.7	489,865	99.3	493,464
1886–1890	4,032	.6	679,283	99.4	683,315
1891–1895	10,014	.7	1,346,992	99.3	1,357,006
1896–1900	16,867	1.0	1,693,484	99.0	1,710,351
1901–1905	1,221	.1	1,222,240	99.9	1,223,461
1906–1909	....	....	1,245,000	100.0	1,245,000
1906	....	....	1,200,000	100.0	1,200,000
1907	....	....	1,401,300	100.0	1,401,300
1908	....	....	1,329,000	100.0	1,329,000
1909	....	....	1,049,700	100.0	1,049,700
Wheat.					
Average:					
1872–1875	236,780	1.0	23,658,912	99.0	23,895,692
1876–1880	239,695	1.3	17,992,084	98.7	18,231,779
1881–1885	315,379	3.0	10,357,806	97.0	10,673,185
1886–1890	91,145	.9	9,709,433	99.1	9,800,578
1891–1895	611,164	5.4	10,720,326	94.6	11,331,490
1896–1900	230,155	2.1	10,889,260	97.9	11,119,415
1901–1905	234,547	2.4	9,454,836	97.6	9,689,383
1906–1909	252,666	2.5	9,863,183	97.5	10,115,849

[a] Compiled from annual reports of the Milwaukee Chamber of Commerce.
[b] Including receipts by wagon.
[c] Less than 0.05 of 1 per cent.

TABLE 11.—*Receipts of grain and flour at Milwaukee by lake and rail, 1871-1909*—Continued.

Article and calendar year.	Lake.		Rail.[a]		Total.
	Quantity.	Per cent of total.	Quantity.	Per cent of total.	
Wheat—Continued.	*Bushels.*		*Bushels.*		*Bushels.*
1906	210,726	2.3	8,541,928	97.7	8,752,654
1907	2,093	.8	9,842,355	99.2	9,844,448
1908	294,842	(b)	12,700,427	100.0	12,995,269
1909	503,005	5.7	8,368,021	94.3	8,871,026
Wheat flour.	*Barrels.*		*Barrels.*		*Barrels.*
Average:					
1871-1875	10,016	.8	1,179,173	99.2	1,189,189
1876-1880	17,002	.4	2,212,054	99.6	2,229,056
1881-1885	14,136	.1	3,580,757	99.9	3,594,893
1886-1890	2,089	.1	3,176,263	99.9	3,178,352
1891-1895	2,868	.1	2,396,825	99.9	2,399,693
1896-1900	3,417	.1	2,877,190	99.9	2,880,607
1901-1905	3,503	.1	2,941,903	99.9	2,945,406
1906-1909	2,223	.1	2,977,100	99.9	2,979,323
1906	3,940	.1	2,963,600	99.9	2,967,540
1907	1,955	.1	2,801,050	99.9	2,803,005
1908	1,870	.1	2,676,700	99.9	2,678,570
1909	1,128	(b)	3,467,050	100.0	3,468,178
Total grain and flour.	*Bushels.*		*Bushels.*		*Bushels.*
Average:					
1871-1875 [c]	320,040	1.0	33,324,552	99.0	33,644,592
1876-1880	367,304	1.0	34,691,771	99.0	35,059,075
1881-1885	514,489	1.4	36,985,448	98.6	37,499,937
1886-1890	129,879	.4	36,975,656	99.6	37,105,535
1891-1895	640,400	1.5	42,893,634	98.5	43,534,034
1896-1900	294,061	.5	56,298,804	99.5	56,592,865
1901-1905	270,944	.5	50,405,236	99.5	50,676,180
1906-1909	283,254	(b)	57,333,345	100.0	57,616,599
1906	234,706	.4	57,710,478	99.6	57,945,184
1907	23,638	(b)	60,052,180	100.0	60,075,818
1908	305,090	.5	59,043,977	99.5	59,349,067
1909	569,581	1.1	52,526,746	98.9	53,096,327

[a] Including receipts by wagon.
[b] Less than 0.05 of 1 per cent.
[c] Includes average for wheat for four years only, 1872-1875.

TABLE 12.—*Shipments of grain and flour from Milwaukee by lake and rail, 1871–1909.*[a]

Article and calendar year.	Lake.		Rail.[b]		Total.
	Quantity.	Per cent of total.	Quantity.	Per cent of total.	
Barley.					
Average:	*Bushels.*		*Bushels.*		*Bushels.*
1871–1875	312,770	44.2	394,518	55.8	707,288
1876–1880	426,139	20.5	1,657,045	79.5	2,083,184
1881–1885	252,412	6.8	3,456,739	93.2	3,709,151
1886–1890	1,180,917	26.1	3,345,662	73.9	4,526,579
1891–1895	3,653,358	63.2	2,126,639	36.8	5,779,997
1896–1900	4,247,195	61.1	2,707,417	38.9	6,954,612
1901–1905	3,047,848	38.3	4,911,501	61.7	7,959,349
1906–1909	2,078,701	27.4	5,508,149	72.6	7,586,850
1906	2,688,370	30.9	6,018,575	69.1	8,706,945
1907	1,446,746	20.3	5,667,042	79.7	7,113,788
1908	2,308,033	24.8	7,010,571	75.2	9,318,604
1909	1,871,655	35.9	3,336,406	64.1	5,208,061
Corn.					
Average:					
1871–1875	559,299	93.2	41,086	6.8	600,385
1876–1880	558,640	75.6	180,060	24.4	738,700
1881–1885	400,550	40.3	593,807	59.7	994,357
1886–1890	32,364	7.1	421,728	92.9	454,092
1891–1895	25,713	6.6	364,844	93.4	390,557
1896–1900	3,832,020	87.9	525,581	12.1	4,357,601
1901–1905	725,967	36.2	1,281,915	63.8	2,007,882
1906–1909	840,248	16.1	4,377,524	83.9	5,217,772
1906	1,229,598	23.7	3,950,680	76.3	5,180,278
1907	1,583,926	23.6	5,116,647	76.4	6,700,573
1908	95,730	3.2	2,934,472	96.8	3,030,202
1909	451,736	7.6	5,508,299	92.4	5,960,035
Oats.					
Average:					
1871–1875	789,392	79.1	208,202	20.9	997,594
1876–1880	724,020	50.2	719,220	49.8	1,443,240
1881–1885	239,302	13.0	1,606,575	87.0	1,845,877
1886–1890	208,232	13.8	1,302,141	86.2	1,510,373
1891–1895	3,108,536	57.9	2,256,532	42.1	5,365,068
1896–1900	7,114,057	80.1	3,762,493	19.9	10,876,550
1901–1905	1,875,612	28.8	4,641,067	71.2	6,516,679
1906–1909	482,270	6.1	7,429,414	93.9	7,911,684
1906	714,975	9.7	6,675,476	90.3	7,390,451
1907	476,450	5.0	9,111,743	95.0	9,588,193
1908	686,556	7.6	8,364,660	92.4	9,051,216
1909	51,100	.9	5,565,777	99.1	5,616,877
Rye.					
Average:					
1871–1875	120,368	70.9	49,307	29.1	169,675
1876–1880	349,342	61.2	221,778	38.8	571,120
1881–1885	61,508	14.4	365,379	85.6	426,887
1886–1890	184,543	34.5	350,634	65.5	535,177
1891–1895	459,748	48.2	494,379	51.8	954,127
1896–1900	980,970	73.2	359,188	26.8	1,340,158
1901–1905	247,274	34.6	466,415	65.4	713,689
1906–1909	87,038	11.0	702,111	89.0	789,149
1906	66,000	8.8	683,515	91.2	749,515
1907	90,908	10.6	768,022	89.4	858,930
1908	191,244	22.4	661,896	77.6	853,140
1909	....	....	695,010	100.0	695,010
Wheat.					
Average:					
1871–1875	16,769,634	88.3	2,212,508	11.7	18,982,142
1876–1880	11,209,451	72.4	4,264,586	27.6	15,474,037
1881–1885	2,602,181	45.3	3,141,711	54.7	5,743,892
1886–1890	2,508,327	52.6	2,259,056	47.4	4,767,383
1891–1895	1,230,410	45.5	1,474,131	54.5	2,704,541
1896–1900	947,078	30.7	2,137,219	69.3	3,084,297
1901–1905	427,657	17.7	1,984,285	82.3	2,411,942
1906–1909	2,157,913	53.7	1,862,258	46.3	4,020,171

[a] Compiled from annual reports of the Milwaukee Chamber of Commerce.
[b] Including shipments across Lake Michigan by car ferries and other transit lines.

TABLE 12.—*Shipments of grain and flour from Milwaukee by lake and rail, 1871–1909*—Continued.

Article and calendar year.	Lake.		Rail.[a]		Total.
	Quantity.	Per cent of total.	Quantity.	Per cent of total.	
Wheat—Continued.	*Bushels.*		*Bushels.*		*Bushels.*
1906	1,712,070	64.8	929,932	35.2	2,642,002
1907	2,678,645	60.8	1,724,369	39.2	4,403,014
1908	3,547,898	55.7	2,817,459	44.3	6,365,357
1909	693,040	26.0	1,977,270	74.0	2,670,310
Wheat flour.					
Average:	*Barrels.*		*Barrels.*		*Barrels.*
1871–1875	773,965	44.8	952,546	55.2	1,726,511
1876–1880	711,352	26.6	1,960,607	73.4	2,6[illegible],959
1881–1885	1,322,671	31.2	2,922,999	68.8	4,245,670
1886–1890	1,855,749	46.8	2,111,608	53.2	3,967,357
1891–1895	1,905,614	53.8	1,638,861	46.2	3,544,475
1896–1900	2,153,239	53.6	1,863,499	46.4	4,016,738
1901–1905	2,061,466	53.6	1,781,923	46.4	3,843,389
1906–1909	1,974,876	53.1	1,741,769	46.9	3,716,645
1906	1,851,211	53.7	1,595,543	46.3	3,446,754
1907	2,045,584	59.7	1,382,167	40.3	3,427,751
1908	2,029,790	54.1	1,722,243	45.9	3,752,033
1909	1,972,920	46.5	2,267,122	53.5	4,240,042
Total grain and flour.[b]					
Average:	*Bushels.*		*Bushels.*		*Bushels.*
1871–1875	22,034,305	75.4	7,192,079	24.6	29,226,384
1876–1880	16,468,676	50.9	15,865,421	49.1	32,334,097
1881–1885	9,507,973	29.9	22,317,706	70.1	31,825,679
1886–1890	12,465,253	42.0	17,181,457	58.0	29,646,710
1891–1895	17,053,028	54.8	14,091,400	45.2	31,144,428
1896–1900	26,810,896	62.8	15,877,643	37.2	42,688,539
1901–1905	15,600,955	42.3	21,303,836	57.7	36,904,791
1906–1909	14,533,113	34.4	27,717,415	65.6	42,250,528
1906	14,741,463	36.7	25,438,121	63.3	40,179,584
1907	15,481,803	35.1	28,607,575	64.9	44,089,378
1908	15,963,516	35.1	29,539,151	64.9	45,502,667
1909	11,945,671	30.4	27,284,811	69.6	39,230,482

[a] Including shipments across Lake Michigan by car ferries and other transit lines.
[b] Flour reduced to terms of grain by assuming 1 barrel of flour to be the product of 4½ bushels of wheat.

TRANSIT LINES AT MILWAUKEE.

The so-called transit lines starting from Milwaukee consist of vessels used to transfer railroad traffic across Lake Michigan, and the service is distinct from that performed by lake carriers which cover longer distances and deliver grain at terminal markets like Buffalo. The transit service on Lake Michigan is performed by two classes of vessels; one consists of ordinary carriers which receive grain in bulk from elevators, carry it across the lake, and transfer it again through elevators to railroad cars; the other consists of ferryboats on which railroad cars are carried across Lake Michigan. From 1901 to 1907, as shown in Table 13, the relative quantity of grain and flour shipped by car ferries increased, while that shipped by other vessels ("break-bulk" carriers) decreased. In 1908 and 1909, however, conditions were reversed, car ferries carrying in 1908 only about 43 per cent and in 1909, 33 per cent of the total grain and flour shipped from Milwaukee across Lake Michigan.

TABLE 13.—*Shipments of grain and flour from Milwaukee across Lake Michigan, 1901–1909.*[a]

Year.	By car ferries.		By other vessels.		Total.
	Quantity.	Per cent of total.	Quantity.	Per cent of total.	
	Bushels.		*Bushels.*		*Bushels.*
1901	2,450,887	28.9	6,038,459	71.1	8,489,346
1902	3,488,892	38.5	5,583,781	61.5	9,072,673
1903	7,432,873	65.5	3,918,607	34.5	11,351,480
1904	8,278,024	69.7	3,594,033	30.3	11,872,057
1905	6,619,585	64.3	3,682,213	35.7	10,301,798
1906	6,751,978	63.3	3,912,656	36.7	10,664,634
1907	8,104,279	66.8	4,025,070	33.2	12,129,349
1908	4,860,770	43.4	6,326,294	56.6	11,187,064
1909	4,381,572	33.4	8,754,939	66.6	13,136,511

[a] Compiled from annual reports of the Milwaukee Chamber of Commerce.

DESTINATIONS OF GRAIN SHIPPED FROM MILWAUKEE.

Shipments of grain from Milwaukee to Buffalo amounted in 1901–1905 to an average of about 5,000,000 bushels a year, while the total shipments by lake to all destinations were about 6,000,000 bushels. The shipments to Canadian ports from Milwaukee were consigned chiefly to the Georgian Bay and neighboring waters. Trade to Canadian ports east of the Welland Canal declined from 1871–1875 to 1901–1905, there being no recorded shipments over this route in 1901–1906, but in 1907 there were 156,000 bushels of corn and wheat, and in 1909, 108,500 bushels of corn.

TABLE 14.—*Shipments of grain from Milwaukee by lake, 1871–1909, showing principal ports to which consigned.*[a]

UNITED STATES PORTS.

Port and year.	Barley.	Corn.	Oats.	Rye.	Wheat.	All grain.
LAKE ERIE AND DETROIT RIVER.						
Buffalo.						
Average:	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*
1871–1875	262,773	336,197	471,224	111,487	11,116,878	12,298,559
1876–1880	335,151	421,160	373,096	325,230	7,777,422	9,232,059
1881–1885	194,851	283,115	49,755	54,953	2,004,089	2,586,763
1886–1890	1,111,803	....	20,780	133,233	2,225,881	3,491,697
1891–1895	3,163,415	8,933	2,636,204	312,590	1,025,379	7,146,521
1896–1900	3,961,572	3,024,613	6,457,508	906,283	887,391	15,237,367
1901–1905	2,531,197	572,395	1,603,501	228,274	355,085	5,290,452
1906–1909	1,961,988	609,970	422,333	83,788	2,126,734	5,204,813
1906	2,329,168	985,498	548,075	66,000	1,704,070	5,632,811
1907	1,387,596	1,225,100	434,950	90,908	2,608,928	5,747,482
1908	2,259,533	73,230	662,306	178,244	3,503,898	6,677,211
1909	1,871,655	156,050	44,000	....	690,040	2,761,745
Erie.						
Average:						
1871–1875	17,416	6,237	75,825	557	1,148,963	1,248,998
1876–1880	40,326	212	86,060	7,000	936,718	1,070,316
1881–1885	35,686	14,938	1,690	6,440	175,278	234,032
1886–1890	16,997	....	....	51,245	120,122	188,364
1891–1895	105,817	....	15,280	137,158	151,404	409,659
1896–1900	107,831	162,429	5,680	28,424	140	304,504
1901–1905	68,670	18,116	....	5,000	46,012	137,798
1906–1909	3,000	19,250	150	....	....	22,400

[a] Compiled from annual reports of the Milwaukee Chamber of Commerce.

TABLE 14.—*Shipments of grain from Milwaukee by lake, 1871–1909, showing principal ports to which consigned*—Continued.

UNITED STATES PORTS—Continued.

Port and year.	Barley.	Corn.	Oats.	Rye.	Wheat.	All grain.
LAKE ERIE AND DETROIT RIVER—continued.						
Erie—Continued.	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*
1906	12,000	77,000				89,000
1907						
1908						
1909			600			600
Other ports on Lake Erie, etc.						
Average:						
1871–1875	3,083	4,942	22,015		68,745	98,785
1876–1880	32,426				18,822	51,248
1881–1885	13,912	8,800			50,068	72,780
1886–1890					70,621	70,621
1891–1895	16,600				4,800	21,400
1896–1900		67,600	61,288	28,239	21,904	179,031
1901–1905	30,899			14,000		44,899
1906–1909		31,562				31,562
1906		126,250				126,250
1907						
1908						
1909						
LAKE ONTARIO AND ST. LAWRENCE RIVER.						
Ogdensburg.						
Average:						
1871–1875	13,403	6,925	3,921	380	482,358	506,987
1876–1880	3,403	116	359	2,023	147,193	153,094
1881–1885						
1886–1890	520				2,210	2,730
1891–1895	3,600	2,600	207,950			214,150
1896–1900	5,000				14,000	19,000
1901–1905	26,714		69,940			96,654
1906–1909			15,125			15,125
1906			25,500			25,500
1907			35,000			35,000
1908						
1909						
Oswego.						
Average:						
1871–1875	12,832	30,806	33	3,260	1,425,506	1,472,437
1876–1880		7,132		2,700	610,443	620,275
1881–1885					22,102	22,102
1886–1890	41,840				3,970	45,810
1891–1895	327,129		1,800			328,929
1896–1900	160,313		3,000			163,313
1901–1905	293,888		3,851			297,739
1906–1909	101,512		3,188			104,700
1906	298,400					298,400
1907	59,150					59,150
1908	48,500		12,750			61,250
1909						
Other ports on Lake Ontario, etc.						
Average:						
1871–1875		17,885	1,080		149,967	168,932
1876–1880		7,554			221,524	229,078
1881–1885	6,120					6,120
1886–1890	9,357					9,357
1891–1895	4,679					4,679
1896–1900						
1901–1905						
1906–1909						

TABLE 14.—*Shipments of grain from Milwaukee by lake, 1871-1909, showing principal ports to which consigned*—Continued.

UNITED STATES PORTS—Continued.

Port and year.	Barley.	Corn.	Oats.	Rye.	Wheat.	All grain.
LAKE MICHIGAN AND GREEN BAY.						
Average:	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*
1871-1875	3,263	52,484	146,593	3,284	79,652	285,276
1876-1880	6,419	52,631	156,743	2,277	123,548	341,618
1881-1885	1,843	37,821	160,680	115	93,841	294,300
1886-1890	400	32,364	124,930	65	57,803	215,562
1891-1895	....	2,743	14,418	....	7,427	24,588
1896-1900	125	22,640	17,252	8,080	15,643	63,740
1901-1905	....	26,420	9,180	....	14,860	50,460
1906-1909	250	29,884	12,600	....	7,500	50,234
1906	1,000	40,850	25,900	....	8,000	75,750
1907	....	39,000	6,500	....	14,000	59,500
1908	....	22,500	11,500	....	5,000	39,000
1909	....	17,186	6,500	....	3,000	26,686
OTHER UNITED STATES PORTS.						
Average:						
1871-1875	....	5,077	64,426	1,400	16,764	87,667
1876-1880	9	2,090	100,978	....	86	103,163
1881-1885	....	645	27,177	....	4,434	32,256
1886-1890	....	....	62,522	....	....	62,522
1891-1895	32,118	11,437	232,884	....	41,400	317,839
1896-1900	....	296,761	203,739	....	....	500,500
1901-1905	....	....	6,300	....	....	6,300
1906-1909	....	....	....	....	....	....
TOTAL UNITED STATES PORTS.						
Average:						
1871-1875	312,770	460,553	785,117	120,368	14,488,833	16,167,641
1876-1880	417,734	490,895	717,236	339,230	9,835,756	11,800,851
1881-1885	252,412	345,319	239,302	61,508	2,349,812	3,248,353
1886-1890	1,180,917	32,364	208,232	184,543	2,480,607	4,086,663
1891-1895	3,653,358	25,713	3,108,536	449,748	1,230,410	8,467,765
1896-1900	4,234,841	3,574,043	6,748,467	971,026	939,078	16,467,455
1901-1905	2,951,368	616,931	1,692,772	247,274	415,957	5,924,302
1906-1909	2,066,750	690,666	453,395	83,788	2,134,234	5,428,833
1906	2,640,568	1,229,598	599,475	66,000	1,712,070	6,247,711
1907	1,446,746	1,264,100	476,450	90,908	2,622,928	5,901,132
1908	2,308,033	95,730	686,556	178,244	3,508,898	6,777,461
1909	1,871,655	173,236	51,100	....	693,040	2,789,031

CANADIAN PORTS.

Port and year.	Barley.	Corn.	Oats.	Rye.	Wheat.	All grain.
LAKE ONTARIO AND ST. LAWRENCE RIVER.						
Average:						
1871-1875	....	53,859	....	....	1,645,731	1,699,590
1876-1880	7,206	62,540	6,151	....	881,560	957,457
1881-1885	....	55,231	....	....	213,579	268,810
1886-1890	....	....	....	....	27,720	27,720
1891-1895	....	....	....	10,000	....	10,000
1896-1900	....	21,850	63,900	5,000	....	90,750
1901-1905	....	....	....	....	....	....
1906-1909	....	53,625	....	....	12,500	66,125
1906	....	....	....	....	....	....
1907	....	106,000	....	....	50,000	156,000
1908	....	....	....	....	....	....
1909	....	108,500	....	....	....	108,500
GEORGIAN BAY, LAKE HURON, AND ST. CLAIR RIVER.						
Average:						
1871-1875	....	11,385	4,275	....	133,022	148,682
1876-1880	1,199	43	633	....	277,521	279,396
1881-1885	....	....	....	....	31,590	31,590
1886-1890	....	....	....	....	....	....
1891-1895	....	....	....	....	....	....
1896-1900	12,354	236,127	301,690	4,944	8,000	563,115
1901-1905	96,480	109,036	182,840	....	11,700	400,056
1906-1909	11,950	95,956	28,875	3,250	11,179	151,210

TABLE 14.—*Shipments of grain from Milwaukee by lake, 1871–1909, showing principal ports to which consigned*—Continued.

CANADIAN PORTS—Continued.

Port and year.	Barley.	Corn.	Oats.	Rye.	Wheat.	All grain.
GEORGIAN BAY, LAKE HURON, AND ST. CLAIR RIVER—con.	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*
1906	47,802		115,500			163,302
1907		213,826			5,717	219,543
1908				13,000	39,000	52,000
1909		170,000				170,000
OTHER CANADIAN PORTS.						
Average:						
1871–1875		33,502			502,048	535,550
1876–1880		5,162		10,112	214,614	229,888
1881–1885					7,200	7,200
1886–1890						
1891–1895						
1896–1900						
1901–1905						
1906–1909						
TOTAL CANADIAN PORTS.						
Average:						
1871–1875		98,746	4,275		2,280,801	2,383,822
1876–1880	8,405	67,745	6,784	10,112	1,373,695	1,466,741
1881–1885		55,231			252,309	307,600
1886–1890					27,720	27,720
1891–1895				10,000		10,000
1896–1900	12,354	257,977	365,590	9,944	8,000	653,865
1901–1905	96,480	109,036	182,840		11,700	400,056
1906–1909	11,950	14 ,582	28,875	3,250	23,679	217,336
1906	47,802		115,500			163,302
1907		319,826			55,717	375,543
1908				13,000	39,000	52.000
1909		278,500				278,500
TOTAL UNITED STATES AND CANADIAN PORTS.						
Average:						
1871–1875	312,770	559,299	789,392	120,368	16,769,634	18,551,463
1876–1880	426,139	558,640	724,020	349,342	11,209,451	13,267,592
1881–1885	252,412	400,550	239,302	61,508	2,602,181	3,555,953
1886–1890	1,180,917	32,364	208,232	184,543	2,508,327	4,114,383
1891–1895	3,653,358	25,713	3,108,536	459,748	1,230,410	8,477,765
1896–1900	4,247,195	3,832,020	7,114,057	980,970	947,078	17,121,320
1901–1905	3,047,848	725,967	1,875,612	247,274	427,657	6,324,358
1906–1909	2,078,701	840,248	482,270	87,038	2,157,913	5,646,170
1906	2,688,370	1,229,598	714,975	66,000	1,712,070	6,411,013
1907	1,446,746	1,583,926	476,450	90,908	2,678,645	6,276,675
1908	2,308,033	95,730	686,556	191,244	3,547,898	6,829,461
1909	1,871,655	451,736	51,100		693,040	3,067,531

SHIPMENTS FROM THE HEAD OF THE LAKES.

The first shipment of wheat from Lake Superior to lower lake ports, it is said, was in 1870, and consisted of 49,700 bushels. During 1871–1875 an average of more than 1,000,000 bushels of wheat and more than 2,000,000 bushels of all grain and flour were shipped through canals at St. Marys Falls. This total includes flour reduced to its equivalent in wheat by assuming one barrel of flour to be the product of 4½ bushels of wheat. During the five years 1901–1905 the total shipments of grain and flour increased to an annual average of nearly 124,000,000 bushels in the traffic passing from Lake Superior

through St. Marys Falls canals, and during the four years ending with 1909 this movement exceeded 176,000,000 bushels. The shipments for 1909 reached nearly 192,000,000 bushels. (See Table 15.)

TABLE 15.—*Shipments of grain and flour through St. Marys Falls canals, 1871-1909.*[a]

Year.	Wheat.	Other grain.	Flour.	Total grain and flour.
Average:	*Bushels.*	*Bushels.*	*Barrels.*	*Bushels.*
1871-1875	1,279,528	292,864	165,002	2,314,901
1876-1880	1,980,763	902,918	397,960	4,674,501
1881-1885	8,069,260	511,520	864,972	12,473,154
1886-1890	18,626,716	1,538,095	2,198,127	30,056,383
1891-1895	40,876,147	2,995,568	6,897,405	74,910,037
1896-1900	56,081,480	24,918,347	7,891,376	116,511,019
1901-1905	61,835,662	31,371,512	6,824,245	123,916,276
1906-1909	100,425,642	46,946,132	6,454,668	176,417,780
1906	84,271,358	54,343,155	6,495,350	167,843,588
1907	98,135,775	43,463,338	6,524,770	170,960,578
1908	106,041,873	43,458,583	5,704,375	175,170,144
1909	113,253,561	46,519,451	7,094,175	191,696,800

[a] Compiled from G. G. Tunell's Statistics of Lake Commerce (United States House of Representatives Doc. No. 277, 55th Cong., 2d sess.) and from the Monthly Summary of Commerce and Finance.

IMPORTANCE OF GRAIN AND FLOUR IN LAKE TRAFFIC.

During the period 1901-1909 from 8 to 12 per cent of the tonnage carried through St. Marys Falls canals consisted of grain and flour. The principal item of lake tonnage, as far as quantity is concerned, is iron ore, and the next is coal. In value, however, grain and flour ranged from 25 to 37 per cent of the total value during 1901-1909, as is shown in Table 16.

TABLE 16.—*Quantity and value of grain and flour, iron ore, coal, and other commodities carried through St. Marys Falls canals, 1901-1909.*[a]

Article.	Average, 1901-1905.		1906.		1907.		1908.		1909.	
	Amount.	Per cent of total.	Amount.	Per cent of total.	Amount.	Per cent of total.	Amount.	Per cent of total.	Amount.	Per cent of total.
Quantity.	*Tons (2,000 lbs.).*		*Tons (2,000 lbs.).*		*Tons (2,000 lbs.).*		*Tons (2,000 lbs.).*		*Tons (2,000 lbs.).*	
Grain and flour	3,290,411	9.4	4,481,912	8.7	4,639,670	8.0	4,794,700	11.6	5,223,491	9.0
Iron ore	22,998,301	65.8	35,357,042	68.3	39,594,944	68.0	24,650,340	59.6	40,014,978	69.1
Coal	5,861,434	16.8	8,739,630	16.9	11,400,095	19.6	9,902,460	23.9	9,940,026	17.2
Other commodities	2,820,941	8.0	3,172,496	6.1	2,582,505	4.4	2,043,057	4.9	2,716,654	4.7
Total	34,971,087	100.0	51,751,080	100.0	58,217,214	100.0	41,390,557	100.0	57,895,149	100.0
Value.	*Dollars.*		*Dollars.*		*Dollars.*		*Dollars.*		*Dollars.*	
Grain and flour	103,731,056	29.7	133,281,196	24.8	166,834,196	29.3	174,424,642	37.1	....	......
Iron ore	70,959,420	20.3	121,981,795	22.7	148,481,040	26.1	83,811,156	17.8	....	......
Coal	19,464,911	5.6	25,136,044	4.7	34,461,584	6.0	28,868,837	6.1	....	......
Other commodities	155,661,883	44.4	257,064,419	47.8	220,053,368	38.6	183,036,683	39.0	....	......
Total	349,817,270	100.0	537,463,454	100.0	569,830,188	100.0	470,141,318	100.0	....	......

[a] Compiled from the Monthly Summary of Commerce and Finance.

INSIGNIFICANCE OF RAIL SHIPMENTS FROM DULUTH AND SUPERIOR.

All but a very small percentage of the grain and flaxseed shipped from Duluth and Superior goes by lake. Table 17, which shows the lake and rail shipments of wheat and flaxseed, indicates that during 1901–1905 only about 5 per cent of the total shipments of wheat and flaxseed were sent by rail, while in later years less than 2 per cent was shipped in this way.

TABLE 17.—*Shipments of wheat and flaxseed by lake and rail from Duluth and Superior, 1901–1909.*[a]

Article and year.	Lake.		Rail.		Total.
	Quantity.	Per cent of total.	Quantity.	Per cent of total.	Quantity.
Wheat.					
Average:	*Bushels.*		*Bushels.*		*Bushels.*
1901–1905	28,560,661	94.8	1,572,245	5.2	30,132,906
1906–1909	47,479,430	98.5	744,325	1.5	48,223,755
1906	38,256,431	97.8	852,923	2.2	39,109,354
1907	48,761,859	99.1	445,875	.9	49,207,734
1908	48,961,298	98.6	703,966	1.4	49,665,264
1909	53,938,131	98.2	974,538	1.8	54,912,669
Flaxseed.					
Average:					
1901–1905	13,794,968	95.1	712,208	4.9	14,507,176
1906–1909	16,248,064	96.6	563,474	3.4	16,811,538
1906	21,803,262	99.4	129,048	.6	21,932,310
1907	17,483,285	96.9	553,848	3.1	18,037,133
1908	15,869,681	95.3	776,605	4.7	16,646,286
1909	9,836,028	92.5	794,393	7.5	10,630,421
Total wheat and flaxseed.					
Average:					
1901–1905	42,353,829	94.9	2,286,253	5.1	44,640,082
1906–1909	63,727,494	98.0	1,307,799	2.0	65,035,293
1906	60,059,693	98.4	981,971	1.6	61,041,664
1907	66,245,144	98.5	999,723	1.5	67,244,867
1908	64,830,979	97.8	1,480,571	2.2	66,311,550
1909	63,774,159	97.3	1,768,931	2.7	65,543,090

[a] Excluding Canadian produce shipped through Duluth in bond. Compiled from annual reports of the Duluth Board of Trade.

DESTINATIONS OF SHIPMENTS FROM DULUTH AND SUPERIOR.

By far the greatest proportion of the shipments of grain from Duluth and Superior has been consigned to Buffalo, as appears in Table 18. In 1901–1905 the total shipments were more than 42,000,000 bushels of grain and nearly 14,000,000 bushels of flaxseed, of which 33,000,000 bushels of grain and 11,000,000 bushels of flaxseed were sent to Buffalo. Very little grain or flaxseed was shipped to American ports east of the Niagara River. Like the shipments from Chicago and Milwaukee, the grain consigned by lake from Duluth and Superior to Canadian ports went chiefly in 1897–1905 to ports on the Georgian Bay and neighboring waters. The shipments of 1907, 1908, and 1909 to Canadian ports east of Welland Canal were considerably larger than in earlier years. The quantity of grain shipped

through the Welland Canal to Canadian ports from Duluth and Superior exceeded 5,000,000 bushels in 1908, while the shipments to ports on the Georgian Bay and neighboring waters were less than 3,000,000 bushels. The ports of Duluth and Superior are practically one, so far as grain traffic is concerned, and are therefore treated in this bulletin as one port, and sometimes are mentioned as Duluth-Superior.

TABLE 18.—*Shipments of grain and flaxseed from Duluth and Superior by lake, 1897-1909, showing principal ports to which consigned.*[a]

UNITED STATES PORTS.

Destination and year.	Grain.						Flaxseed.
	Barley.	Corn.	Oats.	Rye.	Wheat.[b]	Total grain.	
LAKE ERIE AND DETROIT RIVER.							
Buffalo.							
Average:	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*
1897-1900	3,384,606	1,794,025	3,511,726	1,088,312	32,002,301	41,780,970	5,495,976
1901-1905	5,401,826	726,858	3,785,144	759,491	22,549,129	33,222,448	11,093,333
1906-1909	8,466,722	306,388	4,876,483	463,468	37,195,458	51,308,519	12,426,714
1906	8,868,230	130,384	10,120,006	426,167	33,200,995	52,745,782	15,174,546
1907	8,458,231	50,721	2,573,900	482,676	39,763,491	51,329,019	13,299,210
1908	7,744,512	....	3,142,195	514,371	37,530,021	48,931,099	12,933,280
1909	8,795,916	1,044,449	3,669,830	430,658	38,287,323	52,228,176	8,299,820
Erie.							
Average:							
1897-1900	42,534	434,204	8,750	195,868	942,392	1,623,748	209,765
1901-1905	51,976	....	....	....	522,317	574,293	6,336
1906-1909	....	....	....	28,625	838,890	867,515	65,493
1906	....	....	114,500	....	1,216,468	1,330,968	105,235
1907	....	....	....	....	1,340,028	1,340,028	156,737
1908	....	....	....	....	584,062	584,062	....
1909	....	....	....	....	215,000	215,000	....
Other ports on Lake Erie, etc.							
Average:							
1897-1900	66,489	275,688	....	32,030	1,263,777	1,637,984	524,850
1901-1905	134,099	....	48,400	....	1,237,630	1,420,129	990,593
1906-1909	209,749	....	166,500	....	2,078,792	2,455,041	1,823,888
1906	234,500	....	480,000	....	1,409,617	2,124,117	2,186,787
1907	173,500	....	....	....	1,718,189	1,891,689	1,719,433
1908	189,332	....	186,000	....	2,160,452	2,535,784	1,853,126
1909	241,663	....	....	....	3,026,910	3,268,573	1,536,208
LAKE ONTARIO AND ST. LAWRENCE RIVER.							
Ogdensburg.							
Average:							
1897-1900	....	....	....	....	53,625	53,625	....
1901-1905	....	....	....	....	303,664	303,664	....
1906-1909	31,083	....	....	6,250	325,516	362,849	....
1906	....	....	....	25,000	389,564	414,564	....
1907	....	....	....	....	194,000	194,000	....
1908	124,333	....	....	....	360,500	484,833	....
1909	....	....	....	....	358,000	358,000	....

[a] Compiled from annual reports of the Duluth Board of Trade.
[b] Including in 1901 and 1902 Canadian wheat shipped through Duluth in bond; hence, these figures differ somewhat from the corresponding figures in Table 17.

TABLE 18.—*Shipments of grain and flaxseed from Duluth and Superior by lake, 1897–1909, showing principal ports to which consigned*—Continued.

UNITED STATES PORTS—Continued.

Destination and year.	Grain.						Flaxseed.
	Barley.	Corn.	Oats.	Rye.	Wheat.	Total grain.	
LAKE ONTARIO AND ST. LAWRENCE RIVER—continued.							
Oswego.							
Average:	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*
1897–1900							
1901–1905	11,400					11,400	
1906–1909	73,500				98,361	171,861	
1906					46,000	46,000	
1907	58,000				194,444	252,444	
1908	60,000				103,000	163,000	
1909	176,000				50,000	226,000	
OTHER UNITED STATES PORTS.							
Average:							
1897–1900		83,838	24,380	99,911	1,631,160	1,839,289	390,800
1901–1905	11,301	4,825	2,873	42,084	1,810,157	1,871,240	1,178,990
1906–1909				5,000	2,156,592	2,161,592	398,242
1906				20,000	731,102	751,102	492,819
1907					514,000	514,000	571,742
1908					1,571,685	1,571,685	528,409
1909					5,809,583	5,809,583	
TOTAL UNITED STATES PORTS.							
Average:							
1897–1900	3,498,629	2,587,755	3,544,856	1,416,121	35,898,255	46,935,616	6,621,391
1901–1905	5,610,602	731,683	3,836,417	801,575	26,422,897	37,403,174	13,269,252
1906–1909	8,781,054	306,388	5,071,608	474,718	42,693,608	57,327,376	14,714,338
1906	9,102,730	130,384	10,714,506	471,167	36,993,746	57,412,533	17,959,387
1907	8,689,731	50,721	2,573,900	482,676	43,724,152	55,521,180	15,747,122
1908	8,118,177		3,328,195	514,371	42,309,720	54,270,463	15,314,815
1909	9,213,579	1,044,449	3,669,830	430,658	47,746,816	62,105,332	9,836,028

CANADIAN PORTS.

Destination and year.	Barley.	Corn.	Oats.	Rye.	Wheat.	Total grain.	Flaxseed.
LAKE ONTARIO AND ST. LAWRENCE RIVER.							
Average:							
1897–1900		487,566	17,625	57,135	2,497,018	3,059,344	12,618
1901–1905	374,346	8,161	42,400	12,220	669,945	1,107,072	130,609
1906–1909	117,266			93,963	2,618,756	2,829,985	1,154,141
1906	469,065			25,200	455,428	949,693	2,720,884
1907				80,939	2,660,807	2,741,746	1,584,444
1908				211,714	4,825,473	5,037,187	311,236
1909				58,000	2,533,316	2,591,316	
GEORGIAN BAY, LAKE HURON, AND ST. CLAIR RIVER.							
Average:							
1897–1900	4,489	880,839	32,463	11,524	2,338,287	3,267,602	286,900
1901–1905	34,950	343,288	111,630	37,395	3,305,194	3,832,457	395,107
1906–1909		72,604	315,302	22,255	2,088,315	2,498,476	379,585
1906		31,182	652,999		807,257	1,491,438	1,122,991
1907		53,166	826,852		2,376,900	2,756,918	151,719
1908			281,356	72,358	1,511,105	1,864,819	243,630
1909		206,068		16,661	3,657,999	3,880,728	

TABLE 18.—*Shipments of grain and flaxseed from Duluth and Superior by lake, 1897-1909, showing principal ports to which consigned*—Continued.

CANADIAN PORTS—Continued.

Destination and year.	Grain.						Flaxseed.
	Barley.	Corn.	Oats.	Rye.	Wheat.	Total grain.	
OTHER CANADIAN PORTS.							
Average:	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*
1897-1900					270,448	270,448	
1901-1905							
1906-1909					78,750	78,750	
1906							
1907							
1908					315,000	315,000	
1909							
TOTAL CANADIAN PORTS.							
Average:							
1897-1900	4,489	1,368,405	50,088	68,659	5,105,753	6,597,394	299,518
1901-1905	409,296	351,449	154,030	49,615	3,975,139	4,939,529	525,716
1906-1909	117,266	72,604	315,302	116,218	4,785,821	5,407,211	1,533,726
1906	469,065	31,182	652,999	25,200	1,262,685	2,441,131	3,843,875
1907		53,166	326,852	80,939	5,037,707	5,498,664	1,736,163
1908			281,356	284,072	6,651,578	7,217,006	554,866
1909		206,068		74,661	6,191,315	6,472,044	
TOTAL UNITED STATES AND CANADIAN PORTS.							
Average:							
1897-1900	3,498,118	3,956,160	3,594,944	1,484,780	40,999,008	53,533,010	6,920,909
1901-1905	6,019,898	1,083,132	3,990,447	851,190	30,398,036	42,342,703	13,794,968
1906-1909	8,898,320	378,992	5,386,910	590,936	47,479,430	62,734,588	16,248,064
1906	9,571,795	161,566	11,367,505	496,367	38,256,431	59,853,664	21,803,262
1907	8,689,731	103,887	2,900,752	563,615	48,761,859	61,019,844	17,483,285
1908	8,118,177		3,609,551	798,443	48,961,298	61,487,469	15,869,681
1909	9,213,579	1,250,517	3,669,830	505,319	53,938,131	68,577,376	9,836,028

GENERAL DIRECTIONS OF LAKE TRAFFIC.

Of the grain shipped from Chicago, Milwaukee, and Duluth-Superior from 80 to 90 per cent was consigned to United States ports during the period covered by Table 19. Of the shipments to United States ports, from two-thirds to more than four-fifths has been consigned to ports west of the Niagara River. In 1901-1905 a little more than 4 per cent of the shipments from the three great western ports went through Welland Canal to United States ports, and about 3 per cent went through that canal to Canadian ports, leaving the balance of nearly 93 per cent consigned to Canadian and United States ports west of the Niagara River.

TABLE 19.—*Shipments of grain by lake from Chicago and Milwaukee, 1871–1909, and from Chicago, Milwaukee, and Duluth-Superior, 1896–1909, by principal groups of destinations.*

UNITED STATES PORTS.

Port of shipment and calendar year.	Ports on Lake Ontario and St. Lawrence River.		Ports on Lake Erie and Detroit River.		Other.		Total United States ports.	
Chicago and Milwaukee.								
Average:	*Bushels.*	*P. ct.*	*Bushels.*	*P. ct.*	*Bushels.*	*P. ct.*	*Bushels.*	*P. ct.*
1871–1875	5,337,953	7.4	54,031,301	74.6	4,641,878	6.4	64,011,132	88.4
1876–1880	3,421,847	4.5	62,201,741	80.7	4,179,664	5.4	69,803,252	90.6
1881–1885	1,700,566	3.1	41,408,787	76.3	4,900,866	9.0	48,010,219	88.4
1886–1890	5,296,805	6.7	60,016,290	75.7	3,595,841	4.5	68,908,936	86.9
1891–1895	7,430,296	7.5	78,665,987	79.0	6,025,805	6.1	92,122,088	92.6
1896–1900	6,621,650	4.5	113,114,289	76.2	9,968,607	6.7	129,704,546	87.4
1901–1905	4,941,070	6.1	56,351,274	69.3	2,986,673	3.6	64,279,017	79.0
1906–1909	4,694,476	8.2	38,014,433	66.2	2,495,920	4.3	45,204,829	78.7
1906	6,399,554	9.5	44,521,898	66.1	2,746,160	4.1	53,667,612	79.7
1907	4,914,429	6.8	49,538,352	68.3	3,523,561	4.9	57,976,342	80.0
1908	3,835,122	8.4	30,947,259	67.8	2,517,266	5.5	37,299,647	81.7
1909	3,628,800	8.2	27,050,224	61.3	1,196,694	2.7	31,875,718	72.2
Chicago, Milwaukee, and Duluth-Superior.								
Average:								
1896–1900 [a]	6,675,275	3.3	158,156,991	78.3	11,807,896	5.8	176,640,162	87.4
1901–1905	5,256,134	4.3	91,568,144	74.0	4,857,913	3.9	101,682,191	82.2
1906–1909	5,229,186	4.3	92,645,508	77.1	4,657,513	3.9	102,532,207	85.3
1906	6,860,118	5.4	100,722,765	79.2	3,497,262	2.7	111,080,145	87.3
1907	5,360,873	4.0	104,099,088	78.0	4,037,561	3.0	113,497,522	85.0
1908	4,482,955	4.2	82,998,204	77.5	4,088,951	3.8	91,570,110	85.5
1909	4,212,800	3.8	82,761,973	73.4	7,006,277	6.2	93,981,050	83.4

CANADIAN PORTS.

Port of shipment and calendar year.	Ports on Lake Ontario and St. Lawrence River.		Ports on Georgian Bay, Lake Huron, and St. Clair River.		Other.		Total Canadian ports.		Total United States and Canadian ports.
Chicago and Milwaukee.									
Average:	*Bushels.*	*P. ct.*	*Bushels.*	*P. ct.*	*Bushels.*	*P. ct.*	*Bushels.*	*P. ct.*	*Bushels.*
1871–1875	5,345,183	7.4	148,682	0.2	2,932,870	4.0	8,426,735	11.6	72,437,867
1876–1880	4,744,680	6.1	279,396	.4	2,227,992	2.9	7,252,068	9.4	77,055,320
1881–1885	2,592,269	4.8	2,220,288	4.1	1,462,183	2.7	6,274,740	11.6	54,284,959
1886–1890	2,854,336	3.6	6,660,115	8.4	848,173	1.1	10,362,624	13.1	79,271,560
1891–1895	4,641,117	4.6	2,687,041	2.7	75,359	.1	7,403,517	7.4	99,525,605
1896–1900	5,870,376	3.9	12,626,472	8.5	265,287	.2	18,762,135	12.6	148,466,681
1901–1905	2,554,923	3.1	13,298,105	16.4	1,214,036	1.5	17,067,064	21.0	81,346,081
1906–1909	2,978,810	5.2	7,057,810	12.3	2,167,978	3.8	12,204,598	21.3	57,409,427
1906	2,072,884	3.1	9,613,835	14.3	1,992,675	2.9	13,679,394	20.3	67,347,006
1907	4,713,733	6.5	6,940,207	9.6	2,858,657	3.9	14,512,597	20.0	72,488,939
1908	2,212,363	4.8	4,394,949	9.6	1,762,409	3.9	8,369,721	18.3	45,669,368
1909	2,916,260	6.6	7,282,250	16.5	2,058,169	4.7	12,256,679	27.8	44,132,397
Chicago, Milwaukee, and Duluth-Superior.									
Average:									
1896–1900 [a]	8,929,720	4.4	15,894,074	7.9	535,735	.3	25,359,529	12.6	201,999,691
1901–1905	3,661,995	3.0	17,130,562	13.8	1,214,036	1.0	22,006,593	17.8	123,688,784
1906–1909	5,808,796	4.8	9,556,286	8.0	2,246,728	1.9	17,611,810	14.7	120,144,017
1906	3,022,577	2.4	11,105,273	8.7	1,992,675	1.6	16,120,525	12.7	127,200,670
1907	7,455,479	5.6	9,697,125	7.3	2,858,657	2.1	20,011,261	15.0	133,508,783
1908	7,249,550	6.8	6,259,768	5.8	2,077,409	1.9	15,586,727	14.5	107,156,837
1909	5,507,576	4.9	11,162,978	9.9	2,058,169	1.8	18,728,723	16.6	112,709,773

[a] Averages for Duluth-Superior included in this line are for 1897–1900.

SOURCES OF BUFFALO'S GRAIN SUPPLY IN EARLY YEARS.

According to figures reported by James Barton, secretary of two of the first associations of owners of lake boats, Ohio, in 1844 and 1846, supplied the greater proportion of wheat transshipped at Buffalo to the Erie Canal, and in 1845 Illinois furnished the greater share. The rest of the wheat shipped from Buffalo by the Erie Canal came chiefly from Michigan, Wisconsin, and Indiana, and a very small amount from New York and Pennsylvania. Of the corn in this trade, Ohio furnished more than 95 per cent in 1844 and all but 25 bushels in 1845. In 1846 Indiana supplied slightly more corn than Ohio, both States together contributing 98 per cent of the total corn transshipped at Buffalo to the Erie Canal. Corn from Illinois in 1846 amounted to something more than 15,000 bushels, or 1.4 per cent of the total, while Pennsylvania supplied less than one-half of that amount. (See Table 20.)

TABLE 20.—*Transshipments of wheat and corn at Buffalo to the Erie Canal, 1844–1846, by States of origin.*[a]

State of origin.	1844.		1845.		1846.	
	Quantity.	Per cent of total.	Quantity.	Per cent of total.	Quantity.	Per cent of total.
Wheat.	*Bushels.*		*Bushels.*		*Bushels.*	
Ohio	695,710	38.9	262,294	19.3	1,606,017	44.5
Michigan	224,963	12.6	255,127	18.8	485,062	13.4
Illinois	472,562	26.5	479,272	35.4	771,194	21.3
Wisconsin	157,668	8.8	186,552	13.8	311,941	8.6
Indiana	235,194	13.2	168,225	12.4	437,010	12.1
Pennsylvania	....	....	3,520	.3	....	....
New York	7	(b)	6	(b)	2,345	.1
Total	1,786,104	100.0	1,354,996	100.0	3,613,569	100.0
Corn.						
Ohio	109,267	95.4	33,069	99.9	541,904	48.3
Michigan	....	....	....	....	....	....
Illinois	....	....	....	....	15,313	1.4
Wisconsin	....	....	....	....	....	....
Indiana	5,262	4.6	....	....	555,250	49.6
Pennsylvania	....	....	....	....	7,222	.7
New York	....	....	25	.1	....	....
Total	114,529	100.0	33,094	100.0	1,119,689	100.0

[a] Compiled from James Barton's Commerce of the Lakes. 1847.
[b] Less than 0.05 of 1 per cent.

RECEIPTS OF GRAIN AND FLOUR BY LAKE AT BUFFALO.

The wheat and flour trade at Buffalo dates back to about the time of the completion of the Erie Canal in 1825. During the first twenty or more years most of the grain received at Buffalo came from Ohio ports, having been produced in States east of Illinois. During 1836–1840, just at the beginning of the lake traffic between Buffalo and Chicago, the receipts of grain, including flour, at Buffalo exceeded

2,000,000 bushels a year. The highest annual average for any five-year period, as shown in Table 21, reached almost 223,000,000 bushels in 1896–1900. The average in 1901–1905 was less than 160,000,000 bushels, and in 1906–1909 about 151,000,000 bushels.

TABLE 21.—*Receipts of grain and flour by lake at Buffalo, 1836–1909.*[a]

Calendar year.	Grain.					Flour.	Total grain and flour.[b]
	Barley.	Corn.	Oats.	Rye.	Wheat.		
Average:	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*	*Barrels.*	*Bushels.*
1836–1840	975	80,866	7,554	1,135	761,876	286,974	2,143,789
1841–1845	1,265	214,341	11,590	1,041	1,792,580	808,749	5,660,187
1846–1850	10,226	2,506,217	388,853	23,385	4,875,745	1,358,201	13,916,331
1851–1855	283,595	7,802,345	2,482,437	141,342	5,333,970	1,041,902	20,732,248
1856–1860	203,252	7,293,685	1,365,494	125,015	11,041,739	1,210,156	25,474,887
1861–1865	532,790	19,163,956	6,384,492	612,608	21,979,367	2,360,123	59,293,767
1866–1870	1,303,720	16,706,407	8,991,888	791,150	14,939,972	1,465,042	49,325,826
1871–1875	1,668,038	27,374,639	6,983,941	538,644	26,055,158	1,360,754	68,743,814
1876–1880	1,315,900	36,928,396	2,710,720	1,336,012	31,265,377	937,450	77,774,930
1881–1885	535,852	26,128,194	2,477,023	1,235,366	25,650,176	1,968,192	64,883,475
1886–1890	1,945,902	37,406,068	8,347,768	826,656	33,601,992	5,110,954	105,127,679
1891–1895	6,750,486	33,733,800	17,454,224	1,800,334	64,232,936	9,779,068	167,977,586
1896–1900	13,523,209	57,945,939	40,928,201	4,403,061	57,536,825	10,749,681	222,710,799
1901–1905	11,524,452	31,407,065	22,632,623	2,122,989	46,181,778	10,137,028	159,485,533
1906–1909	12,339,932	21,065,453	14,697,436	1,017,360	61,786,212	8,938,400	151,129,193
1906	13,681,058	25,976,478	23,951,155	1,243,640	55,544,832	10,279,384	166,654,391
1907	11,264,101	28,477,767	11,272,858	1,313,174	66,658,138	9,759,676	162,904,580
1908	11,649,064	13,779,988	10,455,716	856,944	63,857,080	7,818,248	135,780,908
1909	12,765,503	16,027,578	13,110,014	655,684	61,084,797	7,896,292	139,176,890

[a] Compiled from annual reports of the Buffalo Merchants' Exchange, Buffalo Chamber of Commerce, and (1909) the New York Produce Exchange. Imports from Canada not included after 1876.
[b] Flour reduced to terms of grain by assuming 1 barrel of flour to be the product of 4½ bushels of wheat.

ORIGIN OF GRAIN AND FLAXSEED RECEIVED BY LAKE AT BUFFALO.

Data showing the principal ports of shipment of the grain and flaxseed received at Buffalo are available beginning with 1898. During the periods 1898–1900 and 1901–1905 the principal source of Buffalo's grain supply was Chicago, and the second in importance was Duluth-Superior. For a few years, beginning with 1906, Duluth and Superior were ahead of Chicago in shipments of grain, as they were in flaxseed during the entire period covered by Table 22.

Receipts of grain at Buffalo from Fort William, Ontario, on the north shore of Lake Superior, reached an average of 10,000,000 bushels a year, chiefly wheat, during 1906–1908, and receipts from Port Arthur increased until in 1908 they exceeded 6,000,000 bushels. Of the total receipts of grain at Buffalo, which in 1901–1905 exceeded an annual average of 113,000,000 bushels, all but about 8,000,000 bushels were shipped from United States ports. In 1908 the receipts from Canadian ports reached almost 17,000,000 bushels, while the total receipts at Buffalo by lake were nearly 101,000,000 bushels of grain.

TABLE 22.—*Receipts of grain and flaxseed by lake at Buffalo, 1898–1908, showing principal ports from which shipped.*[a]

Port of shipment and calendar year.	Grain.						Flaxseed.
	Barley.	Corn.	Oats.	Rye.	Wheat.	Total grain.	
UNITED STATES PORTS.							
Duluth and Superior.							
Average:	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*
1898–1900	2,701,895	3,114,291	2,680,516	1,025,360	32,722,813	42,244,875	5,287,929
1901–1905	5,183,865	787,141	4,077,084	661,729	21,897,896	32,607,715	10,713,630
1906–1908	7,756,354	357,503	5,539,054	510,860	36,259,532	50,423,303	14,081,773
1906	8,332,159	208,920	9,934,679	342,000	32,860,390	51,678,148	15,444,665
1907	7,959,996	863,588	3,566,326	609,607	36,986,093	49,985,610	13,452,760
1908	6,976,908	....	3,116,156	580,974	38,932,112	49,606,150	13,347,893
Other ports on Lake Superior and St. Marys River.							
Average:							
1898–1900	1,360,764	1,277,565	1,402,808	338,910	112,688	4,492,735	4,109
1901–1905	978,993	248,699	2,333,140	92,032	165,620	3,818,484	....
1906–1908	62,792	116,043	1,126,863	14,916	168,767	1,489,381	....
1906	188,375	348,131	3,104,588	44,750	....	3,685,844	....
1907	....	....	276,000	....	380,000	656,000	....
1908	....	....	....	....	126,300	126,300	....
Chicago.							
Average:							
1898–1900	2,091,347	47,948,965	16,665,098	955,772	14,503,827	82,165,009	1,562,167
1901–1905	730,612	28,566,045	7,676,344	732,374	12,348,933	50,054,308	360,498
1906–1908	399,495	21,457,552	3,176,807	284,608	8,954,967	34,273,419	93,286
1906	639,985	24,295,531	4,127,022	398,190	8,047,077	37,507,805	254,700
1907	376,500	26,297,138	2,509,518	410,615	12,084,546	41,678,317	....
1908	182,000	13,779,988	2,893,880	45,020	6,733,246	23,634,134	25,158
Milwaukee.							
Average:							
1898–1900	3,535,409	4,108,695	5,556,954	493,534	1,007,833	14,702,425	5,330
1901–1905	2,354,241	555,081	1,047,780	227,635	423,971	4,608,708	10,337
1906–1908	2,089,158	674,965	798,573	158,034	2,642,866	6,363,596	....
1906	2,356,575	869,896	629,625	136,000	1,373,640	5,365,736	....
1907	1,233,235	1,155,000	912,000	169,152	2,897,000	6,366,387	....
1908	2,677,662	....	854,095	168,950	3,657,958	7,358,665	....
Other ports on Lake Michigan and Green Bay.							
Average:							
1898–1900	2,331,285	1,366,035	6,426,921	564,525	1,418,667	12,107,433	....
1901–1905	2,261,941	596,519	6,821,395	383,600	1,247,346	11,310,801	8,312
1906–1908	1,453,240	138,680	3,723,729	169,500	406,220	5,891,369	....
1906	1,590,196	254,000	6,047,241	322,700	491,000	8,705,137	....
1907	1,694,370	162,041	4,009,014	123,800	485,104	6,474,329	....
1908	1,075,154	....	1,114,932	62,000	242,556	2,494,642	....
Toledo.							
Average:							
1898–1900	....	2,413,237	60,333	26,000	5,829,691	8,329,261	....
1901–1905	....	293,520	593,620	25,619	1,911,354	2,824,113	....
1906–1908	....	....	....	....	579,000	579,000	....
1906	....	....	....	....	337,000	337,000	....
1907	....	....	....	....	782,000	782,000	....
1908	....	....	....	....	618,000	618,000	....

[a] Compiled from annual reports of the Buffalo Merchants' Exchange and the Buffalo Chamber of Commerce.

TABLE 22.—*Receipts of grain and flaxseed by lake at Buffalo, 1898-1908, showing principal ports from which shipped*—Continued.

Port of shipment and calendar year.	Grain.						Flaxseed.
	Barley.	Corn.	Oats.	Rye.	Wheat.	Total grain.	
UNITED STATES PORTS—con.							
Cleveland.							
Average:	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*
1898-1900	31,533	1,381,899	593,667	....	374,491	2,381,590	....
1901-1905	....	90,200	13,020	....	229,901	333,121	....
1906-1908	178,756	....	....	....	140,000	318,756	....
1906	536,268	....	....	....	160,000	696,268	....
1907	....	....	....	....	150,000	150,000	....
1908	....	....	....	....	110,000	110,000	....
Detroit.							
Average:							
1898-1900	30,667	51,333	....	53,667	646,967	782,634	....
1901-1905	....	....	....	....	32,000	32,000	....
1906-1908	....	....	....	....	163,667	163,667	....
1906	....	....	....	....	241,000	241,000	....
1907	....	....	....	....	250,000	250,000	....
1908	....	....	....	....	....	....	....
All other United States ports.							
Average:							
1898-1900	15,000	....	78,000	7,999	91,667	192,666	....
1901-1905	....	....	31,047	....	63,000	94,047	....
1906-1908	12,500	....	36,000	....	....	48,500	....
1906	37,500	....	108,000	....	....	145,500	....
1907	....	....	....	....	....	....	....
1908	....	....	....	....	....	....	....
Total United States ports.							
Average:							
1898-1900	12,097,900	61,662,020	33,464,297	3,465,767	56,708,644	167,398,628	6,859,535
1901-1905	11,509,652	31,137,205	22,593,430	2,122,989	38,320,021	105,683,297	11,092,777
1906-1908	11,952,294	22,744,744	14,401,025	1,137,919	49,305,007	99,540,989	14,175,059
1906	13,681,058	25,976,478	23,951,155	1,243,640	43,510,107	108,362,438	15,699,365
1907	11,264,101	28,477,767	11,272,858	1,313,174	54,014,743	106,342,643	13,452,760
1908	10,911,724	13,779,988	7,979,063	856,944	50,390,172	83,917,891	13,373,051
CANADIAN PORTS.							
Fort William.							
Average:							
1898-1900	....	....	....	....	3,186,484	3,186,484	244
1901-1905	14,800	269,860	39,193	....	6,569,418	6,893,271	40,480
1906-1908	129,224	....	498,269	....	9,484,430	10,111,923	91,198
1906	....	....	....	....	10,309,476	10,309,476	....
1907	....	....	....	....	9,815,997	9,815,997	....
1908	387,672	....	1,494,807	....	8,327,818	10,210,297	273,595
Port Arthur.							
Average:							
1898-1900	....	....	....	....	....	....	....
1901-1905	....	....	....	....	1,246,339	1,246,339	....
1906-1908	116,556	....	327,282	....	3,149,694	3,593,532	....
1906	....	....	....	....	1,724,749	1,724,749	....
1907	....	....	....	....	2,827,398	2,827,398	....
1908	349,668	....	981,846	....	4,896,936	6,228,450	....

TABLE 22.—*Receipts of grain and flaxseed by lake at Buffalo, 1898–1908, showing principal ports from which shipped*—Continued.

Port of shipment and calendar year.	Grain.						Flaxseed.
	Barley.	Corn.	Oats.	Rye.	Wheat.	Total grain.	
CANADIAN PORTS—continued.							
Other Canadian ports.							
Average:	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*
1898–1900	25,500				7,308	32,808	
1901–1905					46,000	46,000	
1906–1908					70,718	70,718	
1906							
1907							
1908					212,154	212,154	
Total Canadian ports.							
Average:							
1898–1900	25,500				3,193,792	3,219,292	244
1901–1905	14,800	269,860	39,193		7,861,757	8,185,610	40,480
1906–1908	245,780		825,551		12,704,843	13,776,174	91,198
1906					12,034,225	12,034,225	
1907					12,643,395	12,643,395	
1908	737,340		2,476,653		13,436,908	16,650,901	273,595
TOTAL UNITED STATES AND CANADIAN PORTS.							
Average:							
1898–1900	12,123,400	61,662,020	33,464,297	3,465,767	59,902,436	170,617,920	6,859,779
1901–1905	11,524,452	31,407,065	22,632,623	2,122,989	46,181,778	113,868,907	11,133,257
1906–1908	12,198,074	22,744,744	15,226,576	1,137,919	62,009,850	113,317,163	14,266,257
1906	13,681,058	25,976,478	23,951,155	1,243,640	55,544,332	120,396,663	15,699,365
1907	11,264,101	28,477,767	11,272,858	1,313,174	66,658,138	118,986,038	13,452,760
1908	11,649,064	13,779,988	10,455,716	856,944	63,827,080	100,568,792	13,646,646

MOVEMENT FROM BUFFALO BY RAIL AND CANAL.

The proportion of grain shipped by rail and by canal from Buffalo elevators according to Table 23 has undergone marked changes since 1870. In 1871–1875, 81 per cent of the shipments of grain from Buffalo went by canal, and in 1901–1905 less than 16 per cent, while the rail shipments increased from 19 per cent in the first period to more than 84 per cent in 1901–1905.

TABLE 23.—*Shipments of grain from Buffalo elevators by rail and canal, 1871–1908.*[a]

Calendar year.	Rail.		Canal.		Total.
	Bushels.	Per cent.	Bushels.	Per cent.	Bushels.
Average:					
1871–1875	10,503,649	19.0	44,737,530	81.0	55,241,179
1876–1880	18,862,531	26.5	51,180,648	73.5	70,043,179
1881–1885	15,225,946	30.7	34,386,074	69.3	49,612,020
1886–1890	32,801,024	43.6	42,405,719	56.4	75,206,743
1891–1895	77,363,202	67.9	36,547,597	32.1	113,910,799
1896–1900	144,291,296	85.6	24,289,304	14.4	168,580,600
1901–1905	85,869,019	84.5	15,738,682	15.5	101,607,701
1906–1908	66,282,315	79.2	17,454,985	20.8	83,737,300
1906	72,373,194	77.8	20,604,954	22.2	92,978,148
1907	69,024,950	79.9	17,355,838	20.1	86,380,788
1908	57,448,800	80.0	14,404,164	20.0	71,852,964

[a] Compiled from annual reports of the Buffalo Merchants' Exchange and the Buffalo Chamber of Commerce.

DECLINE IN RECEIPTS AT OSWEGO.

The trade of Oswego by lake has declined considerably during the period covered by this bulletin. From an average of more than 11,000,000 bushels of grain, including flour, received during 1871–1874, the receipts declined to less than one-half million bushels in 1901–1905. With the exception of 1871–1874, barley was the most important grain received, the average annual receipts during 1883–1890 being more than 3,000,000 bushels. Data of grain receipts at Oswego for 1875–1882 are lacking in the reports from which Table 24 was compiled.

TABLE 24.—*Receipts of grain and flour at Oswego by lake, 1871–1909.*[a]

Calendar year.	Grain.						Flour.	Total grain and flour.[b]
	Barley.	Buckwheat.	Corn.	Oats.	Rye.	Wheat.		
	Bushels.	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*	*Barrels.*	*Bushels.*
Average:								
1871–1874	2,858,696	....	2,378,260	79,445	230,509	5,507,130	460	11,056,110
1883–1885	3,984,267	....	453,670	907	361,468	952,548	....	5,752,860
1886–1890	3,117,793	....	470,223	7,889	69,192	595,306	....	4,260,403
1891–1895	847,138	61,361	270,538	25	25,818	172,296	14	1,377,229
1896–1900	226,850	17,191	104,800	1,600	6,522	127,453	14	484,479
1901–1905	428,061	6,747	....	4,087	....	37,111	13	476,064
1906–1909	356,357	....	135,000	38,750	3,188	112,160	6	645,482
1906	390,582	....	....	....	....	46,000	8	436,618
1907	118,045	....	133,000	....	....	151,500	9	402,585
1908	296,800	....	112,000	....	12,750	201,139	8	622,725
1909	620,000	....	295,000	155,000	....	50,000	....	1,120,000

[a] Compiled from annual reports of the Buffalo Merchants' Exchange, Buffalo Chamber of Commerce, and (1909) the New York Produce Exchange.
[b] Flour reduced to terms of grain by assuming 1 barrel of flour to be the product of 4½ bushels of wheat.

CANAL TRAFFIC AT BUFFALO AND OSWEGO.

The shipments of grain, including flour and malt, from Buffalo by canal have decreased considerably during the period covered by Table 25, the shipments in 1901–1905 being scarcely more than one-third of those in 1871–1875. Shipments from Oswego by canal also declined during the period in question. The total grain, including flour and malt, sent from this port by canal in 1871–1874 exceeded 7,000,000 bushels, and in 1901–1905 was little more than a quarter of a million bushels. (See Table 27.) Data for canal trade at Oswego for 1875 were not available when this table was compiled.

As a receiving port for grain carried on the canal Oswego was of greater importance than Buffalo, although neither market obtained much of its supply over this route. Receipts of flaxseed, however, at Buffalo in 1886–1895 were considerable, amounting to an average of two to three million bushels a year. In 1896–1900 these receipts had declined to about 100,000 bushels, and in 1901–1905 the average was 700,000 bushels. (See Tables 26 and 28.) This eastbound traffic in flaxseed apparently consisted of imports from foreign countries forwarded through New York City.

TABLE 25.—*Shipments of grain, flour, and malt from Buffalo by canal, 1871–1909.*[a]

Calendar year.	Grain, flour, and malt.					
	Grain.					
	Barley.	Corn.	Oats.	Rye.	Wheat.	Total grain.
Average:	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*
1871–1875	[b] 761,739	[b] 22,454,201	[b] 4,307,137	[b] 501,676	[b] 19,067,630	44,737,530
1876–1880	512,144	25,130,402	2,261,485	1,023,166	22,253,451	51,180,648
1881–1885	139,826	12,626,727	1,695,718	1,160,971	18,762,832	34,386,074
1886–1890	821,232	17,581,509	2,667,935	476,302	20,858,741	42,405,719
1891–1895	2,176,893	6,210,678	3,656,601	584,340	23,919,085	36,547,597
1896–1900	3,413,610	7,248,386	5,529,199	1,188,112	6,909,997	24,289,304
1901–1905	2,483,370	2,765,245	4,531,047	327,441	5,631,579	15,738,682
1906–1909	2,423,330	2,964,377	4,825,431	128,220	6,724,582	17,065,940
1906	3,169,618	4,470,432	6,521,085	142,563	6,301,256	20,604,954
1907	2,313,069	2,687,287	3,998,230	76,950	8,280,302	17,355,838
1908	2,394,778	2,113,660	3,809,668	75,450	6,010,608	14,404,164
1909	1,815,857	2,586,130	4,972,742	217,916	6,306,164	15,898,809

Calendar year.	Grain, flour, and malt.				Flaxseed.	Total grain, flour, malt, and flaxseed.[c]
	Flour.	Total grain and flour.[c]	Malt.	Total grain, flour, and malt.[c]		
Average:	*Barrels.*	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*
1871–1875	33,990	44,890,485	171,144	45,046,070	[b] 30,162	[d] 45,076,232
1876–1880	6,760	51,211,068	219,962	51,411,033	253,239	51,664,272
1881–1885	5,037	34,408,740	256,542	34,641,960	1,134,738	35,776,698
1886–1890	4,564	42,426,257	189,235	42,598,289	1,042,182	43,640,471
1891–1895	9,469	36,590,207	114,363	36,694,173	2,155,108	38,849,281
1896–1900	85,704	24,674,972	518,703	25,146,520	1,812,922	26,959,442
1901–1905	....	15,738,682	125,548	15,852,817	1,132,034	16,984,851
1906–1909	....	17,065,940	370,650	17,402,896	....	....
1906	....	20,604,954	....	20,604,954	1,349,982	21,954,936
1907	....	17,355,838	468,249	17,781,519	2,079,888	19,861,407
1908	....	14,404,164	502,900	14,861,346	1,901,482	16,762,828
1909	....	15,898,809	511,450	16,363,763	....	....

[a] Compiled from annual reports of the Buffalo Merchants' Exchange, the Buffalo Chamber of Commerce, and (1909) the New York Produce Exchange.
[b] Average, 1871–1874.
[c] Flour reduced to terms of wheat and malt to barley by assuming 1 barrel of flour to be the product of 4½ bushels of wheat, and 1.1 bushels of malt to be the product of 1 bushel of barley.
[d] Includes average for only four years, 1871–1874, for flaxseed.

TABLE 26.—*Receipts of grain, flour, and malt at Buffalo by canal, 1871–1908.*[a]

Calendar year.	Grain, flour, and malt.					
	Grain.					
	Barley.	Corn.	Oats.	Rye.	Wheat.	Total grain.
Average:	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*
1871–1875	10,428	2,834	4,070	....	3,225	20,557
1876–1880	20,967	100	867	....	11,845	33,779
1881–1885	9,765	800	126	....	54,810	65,501
1886–1890	17,255	5,160	....	....	12,871	35,286
1891–1895	3,677	1,200	4,668	....	16,263	25,808
1896–1900	....	....	1,000	....	5,272	6,272
1901–1905	....	....	....	....	1,075	1,075
1906–1908	....	....	....	....	84,600	84,600
1906	....	....	....	....	....	....
1907	....	....	....	....	253,800	253,800
1908	....	....	....	....	....	....

Calendar year.	Grain, flour, and malt.				Flaxseed.	Total grain, flour, malt, and flaxseed.[b]
	Flour.	Total grain and flour.[b]	Malt.	Total grain, flour, and malt.[b]		
Average:	*Barrels.*	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*
1871–1875	6,826	51,274	613	51,831	....	51,831
1876–1880	6,364	62,417	1,418	63,706	155,858	219,564
1881–1885	2,018	74,582	82	74,657	454,070	528,727
1886–1890	40	35,466	....	35,466	3,134,018	3,169,484
1891–1895	3	25,822	....	25,822	2,113,228	2,139,050
1896–1900	....	6,272	....	6,272	104,980	111,252
1901–1905	....	1,075	....	1,075	746,828	747,903
1906–1908	....	84,600	....	84,600	....	84,600
1906	....	....	....	....	....	....
1907	....	253,800	....	253,800	....	253,800
1908	....	....	....	....	....	....

[a] Compiled from annual reports of the Buffalo Merchants' Exchange and the Buffalo Chamber of Commerce.

[b] Flour reduced to terms of wheat and malt to barley by assuming 1 barrel of flour to be the product of 4½ bushels of wheat, and 1.1 bushel, of malt to be the product of 1 bushel of barley.

TABLE 27.—*Shipments of grain, flour, and malt from Oswego by canal, 1871–1908.*[a]

Calendar year.	Grain, flour, and malt.									
	Grain.						Flour.	Total grain and flour.[b]	Malt.	Total grain, flour, and malt.[b]
	Barley.	Corn.	Oats.	Rye.	Wheat.	Total grain.				
Average:	*Bush.*	*Bush.*	*Bush.*	*Bush.*	*Bush.*	*Bush.*	*Bbls.*	*Bush.*	*Bush.*	*Bush.*
1871–1874	2,468,446	1,376,377	66,628	232,816	2,877,392	7,021,659	54,228	7,265,685	78,554	7,337,098
1886–1890	1,496,946	140,582	300	60,192	203,882	1,901,902	5,424	1,926,310	52,046	1,973,625
1891–1895	501,129	208,162	......	18,327	163,370	890,988	1,403	897,302	104,164	991,997
1896–1900	177,456	169,232	6,423	......	90,865	443,976	3,832	461,220	79,528	533,518
1901–1905	246,584	....	40	3,386	6,423	256,433	......	256,433	26,566	280,584
1906–1908	22,238	....	......	......	....	22,238	......	22,238	......	22,238
1906	46,110	....	......	......	....	46,110	......	46,110	......	46,110
1907	20,603	....	......	......	....	20,603	......	20,603	......	20,603
1908	....	....	......	......	....	....	......	....	......	....

[a] Compiled from annual reports of the Buffalo Merchants' Exchange and the Buffalo Chamber of Commerce.

[b] Flour reduced to terms of wheat and malt to barley by assuming 1 barrel of flour to be the product of 4½ bushels of wheat, and 1.1 bushels of malt to be the product of 1 bushel of barley.

TABLE 28.—*Receipts of grain, flour, and malt at Oswego by canal, 1886–1908.*[a]

Calendar year.	Grain, flour, and malt.									
	Grain.						Flour.	Total grain and flour.[b]	Malt.	Total grain, flour, and malt.[b]
	Barley.	Corn.	Oats.	Rye.	Wheat.	Total grain.				
Average:	*Bush.*	*Bush.*	*Bush.*	*Bush.*	*Bush.*	*Bush.*	*Bbls.*	*Bush.*	*Bush.*	*Bush.*
1886–1890	....	130,088	1,000	4,000	102,284	237,372	30	237,507	....	237,507
1891–1895	....	20,373	....	29	34,974	55,376	765	58,818	2,890	61,445
1896–1900	178,326	108,211	600	....	8,511	295,648	975	300,036	3,165	302,913
1901–1905	326,424	98,679	40	....	3,180	428,323	748	431,689	26,566	455,840
1906–1908	130,479	....	....	....	16,087	146,566	....	146,566	....	146,566
1906	213,058	....	....	....	31,900	244,958	....	244,958	....	244,958
1907	149,753	....	....	....	16,360	166,113	....	166,113	....	166,113
1908	28,627	....	....	....	....	28,627	....	28,627	....	28,627

[a] Compiled from annual reports of the Buffalo Merchants' Exchange and the Buffalo Chamber of Commerce.

[b] Flour reduced to terms of wheat and malt to barley by assuming 1 barrel of flour to be the product of 4½ bushels of wheat, and 1.1 bushels of malt to be the product of 1 bushel of barley.

PROPORTION OF GRAIN RECEIVED BY CANAL AT NEW YORK.

During the period covered by Table 29, from 74 to 84 per cent of the grain received at New York City during the seven months of canal and river navigation came by rail, from 15 to 25 per cent by canal, and, except in 1909, less than 1 per cent by coastwise vessels. Figures for the entire year, including the season when the river and canal were closed, show that from 85 to nearly 90 per cent of the grain received at New York came by rail.

TABLE 29.—*Receipts of grain at New York City by canal, coastwise vessels, and railroads, 1901–1909.*[a]

SEASON OF CANAL NAVIGATION (SEVEN MONTHS).

Calendar year.	Canal.		Coastwise vessels.		Railroads.		Total.
Average:	*Bushels.*	*Per cent.*	*Bushels.*	*Per cent.*	*Bushels.*	*Per cent.*	*Bushels.*
1901–1905	11,548,741	21.6	273,361	0.5	41,678,280	77.9	53,500,382
1906–1909	9,346,550	19.5	272,324	0.6	38,217,523	79.9	47,836,397
1906	11,531,600	21.7	104,677	.2	41,607,224	78.1	53,243,501
1907	9,387,100	17.1	126,540	.2	45,312,651	82.7	54,826,291
1908	6,791,500	15.4	193,742	.4	37,093,566	84.2	44,078,808
1909	9,676,000	24.7	664,339	1.7	28,856,650	73.6	39,196,989

THE ENTIRE YEAR.

Calendar year.	Canal.		Coastwise vessels.		Railroads.		Total.
Average:							
1901–1905	11,736,421	13.8	678,199	0.8	72,665,001	85.4	85,079,620
1906–1909	9,558,075	12.4	729,531	0.9	67,112,158	86.7	77,399,764
1906	11,769,800	13.2	137,120	.1	77,458,926	86.7	89,365,846
1907	9,558,500	10.5	138,736	.2	81,403,425	89.3	91,100,661
1908	7,228,000	10.6	849,032	1.2	60,409,128	88.2	68,486,160
1909	9,676,000	15.9	1,793,236	3.0	49,177,151	81.1	60,646,387

[a] Compiled from annual reports of the New York Produce Exchange.

MOVEMENTS IN FOREIGN TRADE.

EXPORTS AND IMPORTS OF GRAIN AND GRAIN PRODUCTS.

Only a small proportion of the grain and grain products exported from the United States is through ports along the Great Lakes and the northern border. Of the total exports of this class of commodities in 1901-1909, averaging $190,000,000 annually, only $13,000,000 worth was exported through northern border and lake ports. In these figures only products of the United States are included. Compared with all the domestic merchandise exported through these ports, grain and grain products formed in 1901-1905 about 10 per cent of the total, and in the four years following a smaller percentage. It is seen from Table 30 that the grain exports of northern border and lake ports are relatively less important than those from the entire United States when compared with exports of all merchandise.

Imports of grain and grain products through northern border and lake ports have varied considerably in amount and also in the proportion they have formed of the imports of these products into the United States as a whole. During the fiscal years 1901-1909 the value of grain and grain products imported through northern border and lake ports ranged from $280,000 in 1902 to $3,224,000 in 1905. The average imports during the nine years in question amounted to something over $1,000,000 annually as compared with nearly $4,000,000 for the entire United States. (See Table 31.)

TABLE 30.—*Exports of all domestic merchandise and of domestic grain and grain products through northern border and lake ports and from the entire United States, 1901-1909.*[a]

Year ending June 30—	All merchandise.		Grain and grain products.			
			United States.		Northern border and lake ports.	
	United States.	Northern border and lake ports.	Amount.	Per cent of all merchandise.	Amount.	Per cent of all merchandise.
Average:						
1901-1905	$1,427,019,925	$120,177,992	$193,636,571	13.6	$12,570,834	10.5
1906-1909	1,761,203,342	175,487,354	186,751,281	10.6	12,780,149	7.3
1901	1,460,462,806	102,559,564	275,844,717	18.9	17,023,024	16.6
1902	1,355,481,861	106,539,296	213,401,238	15.7	12,450,795	11.7
1903	1,392,231,302	118,934,945	221,495,086	15.9	14,011,906	11.8
1904	1,435,179,017	127,376,389	149,366,054	10.4	9,642,149	7.6
1905	1,491,744,641	145,479,766	108,075,761	7.2	9,726,297	6.7
1906	1,717,953,382	168,390,894	187,067,354	10.9	10,562,496	6.3
1907	1,853,718,034	189,517,831	184,399,150	9.9	11,496,209	6.1
1908	1,834,786,357	172,840,344	215,462,142	11.7	15,110,146	8.7
1909	1,638,355,593	171,200,346	160,076,479	9.8	13,951,746	8.1

[a] Compiled from annual reports of the Department of Commerce and Labor on the Foreign Commerce and Navigation of the United States.

TABLE 31.—*Imports of grain and grain products through northern border and lake ports and into the entire United States, 1901–1909.*[a]

Year ending June 30—	Total United States.	Northern border and lake ports.		Year ending June 30—	Total United States.	Northern border and lake ports.	
		Amount.	Per cent of United States.			Amount.	Per cent of United States.
Average:							
1901–1905	$2,782,612	$1,145,310	41.2	1904	$2,554,831	$589,672	23.1
1906–1909	5,444,372	1,043,310	19.2	1905	5,799,402	3,224,388	55.6
				1906	3,685,899	291,027	7.9
1901	1,613,573	692,033	42.9	1907	4,464,803	570,060	12.8
1902	1,537,286	279,831	18.2	1908	5,566,469	938,649	16.9
1903	2,407,968	940,624	39.1	1909	8,060,316	2,373,502	29.4

[a] Compiled from annual reports of the Department of Commerce and Labor on the Foreign Commerce and Navigation of the United States.

EXPORTS OF GRAIN, FLOUR, AND FLAXSEED THROUGH LAKE PORTS.

The most important grains exported through northern border and lake ports are corn and wheat. Of the exports of corn from the United States during 1901–1905, amounting to an annual average of about 85,000,000 bushels, nearly 8,000,000 were shipped through the northern border and lake ports, while in 1871–1875 of the 29,000,000 bushels exported annually through all ports, more than 5,000,000 passed through the northern border and lake ports. Exports of wheat through ports in the Great Lakes region were slightly larger during 1901–1905 than during 1871–1875, and in each of these periods they were more than double the exports for the period 1886–1890. On the other hand, the average exports of wheat from the United States increased to about 90,000,000 bushels in 1901–1905, a quantity double that of 1871–1875. The average annual exports in 1886–1890 from all ports were less than in any other five-year average shown in Table 32, except that for 1871–1875. The wheat flour exported through the northern border and lake ports exceeded an annual average of 1,000,000 barrels in 1896-1900, but fell to less than 600,000 barrels in the next five-year period. The statement showing the exports of flaxseed is valuable chiefly in that it points out the relative insignificance of the trade prior to 1906 and the large exports in 1906–1908.

TABLE 32.—*Exports of domestic corn, wheat, wheat flour, and flaxseed through northern border and lake ports and from the United States, 1871–1909.*[a]

Article, and year ending June 30—	Northern border and lake ports.								Total United States.
	Chicago, Ill.	Detroit, Mich.	Duluth, Minn.	Huron, Mich.	Oswegatchie, N. Y.	Superior, Mich.	All other.	Total northern border and lake ports.	
Corn.									
Average:	*1,000 bushels.*	*1,000 bushels.*	*1,000 bushels.*	*1,000 bushels.*	*1,000 bushels.*	*1,000 bushels.*	*1,000 bushels.*	*1,000 bushels.*	*1,000 bushels.*
1871–1875	2,641	492	(b)	345	5		1,647	5,130	29,231
1876–1880	3,304	620	22	868	12	(b)	2,085	6,914	78,056
1881–1885	2,807	343	73	632	11	(b)	898	4,764	54,552
1886–1890	3,006	873	111	604	79	88	1,464	6,225	59,962
1891–1895	3,289	522	21	561	501	10	657	5,561	49,055
1896–1900	8,449	1,616	116	892	1,619	705	1,426	14,823	173,818
1901–1905	3,843	1,595	59	811	582	649	350	7,889	84,791
1906–1909	3,082	3,142		1,104	278	339	386	8,331	72,330
1906	2,816	3,676		885	773	306	298	8,754	117,719
1907	5,043	3,908	(b)	1,615	182	428	484	11,660	83,301
1908	3,139	2,922		1,126	83	219	355	7,844	52,446
1909	1,331	2,064		790	74	402	405	5,066	35,853
Wheat.									
Average:									
1871–1875	3,036	253	33	92	5		3,164	6,583	44,804
1876–1880	1,589	1,024	156	246		(b)	2,668	5,683	88,682
1881–1885	1,440	530	592	479	26	(b)	1,717	4,784	101,445
1886–1890	781	204	1,613	154		194	212	3,158	65,264
1891–1895	1,407	88	1,031	1	326	1,297	296	4,446	98,810
1896–1900	1,188	69	1,861	3	449	2,860	101	6,531	105,965
1901–1905	2,663	17	1,149	50	459	2,472	114	6,924	89,945
1906–1909	779		2,533		22	1,670	131	5,135	69,709
1906	5	1	801		27	655	8	1,497	34,973
1907	126		1,941			1,680	12	3,759	76,569
1908	1,336	1	3,845			2,449	43	7,674	100,371
1909	1,648		3,545	2	60	1,897	459	7,611	66,923
Wheat flour.									
Average:	*1,000 barrels.*	*1,000 barrels.*	*1,000 barrels.*	*1,000 barrels.*	*1,000 barrels.*	*1,000 barrels.*	*1,000 barrels.*	*1,000 barrels.*	*1,000 barrels.*
1871–1875	13	4	(b)	82	12		16	127	3,360
1876–1880	6	7	3	107	8	(b)	16	147	4,574
1881–1885	7	48	30	137	101	(b)	2	325	8,574
1886–1890	5	120	161	100	(b)	109	9	504	10,654
1891–1895	5	161	216	80	3	219	49	733	15,058
1896–1900	9	99	250	90	(b)	542	48	1,038	16,345
1901–1905	20	11	76	34	1	384	68	594	16,390
1906–1909	54	38	12	38		236	41	419	13,488
1906	28	12	26	30	1	331	29	457	13,919
1907	97	42	20	51	1	126	66	403	15,585
1908	43	82	(b)	33		265	34	457	13,927
1909	49	9	1	37		220	43	359	10,521
Flaxseed.									
Average:	*1,000 bushels.*	*1,000 bushels.*	*1,000 bushels.*	*1,000 bushels.*	*1,000 bushels.*	*1,000 bushels.*	*1,000 bushels.*	*1,000 bushels.*	*1,000 bushels.*
1871–1875									(b)
1876–1880	(a)							(b)	(b)
1881–1885									
1886–1890				10				10	11
1891–1895	6	(b)		136		(b)	1	143	1,529
1896–1900	83	13	138	58	7	110	20	429	2,125
1901–1905	84	1	233	15		293		626	2,304
1906–1909	20		1,066	24		720		1,830	4,371
1906		(b)	1,404	95		823		2,322	5,989
1907	80	(b)	1,522	2		1,527		3,131	6,336
1908			1,009			440		1,449	4,277
1909		(b)	328			90	1	419	883

[a] Compiled from annual reports of the Department of Commerce and Labor on the Foreign Commerce and Navigation of the United States.
[b] Less than 500 bushels or barrels.

GRAIN IMPORTS FROM CANADA.

The principal grains imported into the United States from Canada during the thirty-nine years covered by Table 33 were barley, wheat, and oats. Barley imports during 1881–1890 averaged more than 10,000,000 bushels a year, but declined to 91,000 bushels a year in 1901–1905 and to about 65,000 bushels in 1906–1909. Imports of wheat exceeded an average of 1,000,000 bushels a year during 1871–1880 and 1891–1900, while the imports of oats except in 1909 were considerably less. The greater portion of these imports came through ports along the Canadian border and in all probability were the produce of Canada.

TABLE 33.—*Imports of barley, oats, and wheat through the northern border and lake ports and into the entire United States, 1871-1909.*[a]

Article, and year ending June 30—	Northern border and lake ports.					Total United States.
	Buffalo Creek, N. Y.	Huron, Mich.	Oswego, N. Y.	Other.	Total northern border and lake ports.	
Barley.						
Average:	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*
1871–1875	519,466	70,980	2,817,218	1,338,502	4,746,166	5,164,659
1876–1880	1,220,188	575,115	3,036,171	1,788,857	6,620,281	7,321,877
1881–1885	1,979,859	732,687	4,132,391	3,196,634	10,041,571	10,068,931
1886–1890	2,609,638	460,089	3,560,810	4,047,997	10,678,534	10,817,026
1891–1895	525,319	62,101	964,567	1,020,082	2,572,069	2,620,613
1896–1900	112,238	171	116,177	273,582	502,168	506,841
1901–1905	....	1,473	39,367	33,437	74,277	91,320
1906–1909	14,122	7,541	324	27,032	49,019	64,688
1906	....	10	....	11,782	11,792	18,049
1907	....	15	45	37,086	37,146	38,319
1908	55,581	30,120	1,250	57,709	144,660	199,741
1909	908	20	....	1,551	2,479	2,644
Oats.						
Average:						
1871–1875	39,035	6,489	44,811	437,918	528,253	610,432
1876–1880	5,948	1,714	2,979	110,426	121,067	137,501
1881–1885	69,733	7,423	13,182	457,877	548,215	563,887
1886–1890	3,424	315	....	29,844	33,583	57,883
1891–1895	36,461	2,206	....	26,432	65,099	73,572
1896–1900	543	269	....	11,746	12,558	31,217
1901–1905	475	601	....	32,137	33,213	78,724
1906–1909	800,814	633	....	374,289	1,175,736	1,782,131
1906	123	413	....	4,457	4,993	22,675
1907	30	180	....	62,758	62,968	74,552
1908	243	1,209	....	270,213	271,665	364,307
1909	3,202,858	731	....	1,159,730	4,363,319	6,666,989
Wheat.						
Average:						
1871–1875	90,958	2,020	722,422	303,724	1,119,124	1,137,907
1876–1880	424,253	1,069	294,380	413,103	1,132,805	1,144,529
1881–1885	172,391	581	174,689	119,371	467,032	470,781
1886–1890	201,943	210	46,561	56,144	304,858	305,841
1891–1895	422,164	90,520	10,962	774,485	1,298,131	1,316,581
1896–1900	1,311	59,484	80,707	1,432,981	1,574,483	1,575,761
1901–1905	323,835	86,259	47,338	508,861	966,293	981,137
1906–1909	15,603	273	3,649	173,588	193,113	204,032
1906	36,449	752	14,596	3,217	55,014	57,995
1907	11,151	325	....	360,866	372,342	375,433
1908	5,685	....	....	324,143	329,828	341,617
1909	9,126	16	....	6,125	15,267	41,082

[a] Compiled from annual reports of the Department of Commerce and Labor on the Foreign Commerce and Navigation of the United States.

MOVEMENT OF UNITED STATES GRAIN THROUGH CANADA.

The official customs returns of the Dominion of Canada give, among other data, the quantity of the principal products imported into Canada from the United States, and also the quantities of produce other than that of Canada, which is exported through Canadian ports. Since the United States furnishes practically all of the grain, flour, and flaxseed of foreign origin (from a Canadian point of view) which is exported from Canada, the statistics of reexports of these commodities may be taken as practically the same as the reexports of grain, flour, and flaxseed which have been imported from the United States. A comparison of these reexports with the quantities of the same articles which were imported into Canada from the United States shows that these imports were made largely for subsequent exportation. Corn and wheat constitute the principal grains in this trade. During the fiscal year ending March 31, 1909, the United States wheat shipped through Canadian ports to other foreign countries exceeded 10,000,000 bushels, which was double the traffic of 1908 and exceeded the annual average for any five-year period beginning at least as far back as 1876–1880. (See Table 34.)

TABLE 34.—*Movement of United States grain, flour, and flaxseed through Canada to other foreign countries, 1876–1909.*[a]

Year ending June 30—	Imports into Canada from the United States.	Reexports of foreign produce from Canada to all countries.	Year ending June 30—	Imports into Canada from the United States.	Reexports of foreign produce from Canada to all countries.
Barley.			*Corn.*		
Average:	*Bushels.*	*Bushels.*	Average:	*Bushels.*	*Bushels.*
1876–1880	152,510	105,707	1876–1880	6,655,566	4,016,050
1881–1885	17,056	....	1881–1885	4,660,706	2,817,773
1886–1890	7,752	3	1886–1890	6,126,995	3,650,214
1891–1895	4,052	719	1891–1895	5,954,977	4,071,578
1896–1900	149,301	125,398	1896–1900	15,495,856	10,352,916
1901–1905	208,271	174,280	1901–1905	9,791,932	5,594,410
1906–1909	658,176	674,056	1906–1909	11,123,984	3,400,056
1906	1,923,755	2,005,861	1906	12,028,916	4,820,829
1907	442,118	576,645	1907	10,878,520	3,600,402
1908	62,572	33,372	1908	15,294,869	4,875,670
1909	204,261	80,346	1909	6,293,629	303,321
Buckwheat.			*Oats.*		
Average:			Average:		
1876–1880	18	....	1876–1880	1,347,027	256,589
1881–1885	74	....	1881–1885	187,366	19,108
1886–1890	114	....	1886–1890	339,482	47,033
1891–1895	106	....	1891–1895	279,976	132,949
1896–1900	236	....	1896–1900	988,053	740,021
1901–1905	60	8	1901–1905	1,065,119	583,757
1906–1909	217	229	1906–1909	827,945	668,630
1906	99	916	1906	2,613,847	2,366,628
1907	419	....	1907	483,942	198,471
1908	243	....	1908	88,485	45,662
1909	107	....	1909	125,506	63,758

[a] Compiled from tables of the Trade and Navigation of the Dominion of Canada. Figures for 1907 refer to the nine months ending March 31, 1907; figures for 1908 and 1909 refer to the fiscal years ending March 31, 1908 and 1909.

TABLE 34.—*Movement of United States grain, flour, and flaxseed through Canada to other foreign countries, 1876–1909*—Continued.

Year ending June 30—	Imports into Canada from the United States.	Reexports of foreign produce from Canada to all countries.
Rye.		
Average:	*Bushels.*	*Bushels.*
1876–1880	61,022	10,002
1881–1885	18,921	18,373
1886–1890	50,252	13,655
1891–1895	559,230	559,491
1896–1900	308,315	276,151
1901–1905	407,826	394,843
1906–1909	199,904	68,204
1906	170,361	146,232
1907	114,949	49,950
1908	158,209	25,064
1909	356,098	51,568
Wheat.		
Average:		
1876–1880	5,674,573	3,739,093
1881–1885	4,391,513	3,876,338
1886–1890	3,163,126	2,874,187
1891–1895	4,077,504	3,828,034
1896–1900	5,675,733	5,262,460
1901–1905	6,084,099	6,358,664
1906–1909	4,585,758	4,457,090
1906	676,678	587,725
1907	1,364,402	1,394,411
1908	5,803,452	5,024,010
1909	10,498,502	10,822,214
Wheat flour.		
Average:	*Barrels.*	*Barrels.*
1876–1880	331,731	7,560
1881–1885	372,008	52,359
1886–1890	182,023	21,209
1891–1895	80,615	41,914
1896–1900	70,030	28,387
1901–1905	43,781	1,080
1906–1909	40,038	228
Wheat flour—Continued.	*Barrels.*	*Barrels.*
1906	43,806	130
1907	34,011	56
1908	43,123	717
1909	39,212	10
Flaxseed.		
Average:	*Bushels.*	*Bushels.*
1876–1880	12,129	....
1881–1885	8,432	....
1886–1890	25,322	498
1891–1895	106,851	....
1896–1900	346,527	342,669
1901–1905	486,356	274,178
1906–1909	1,657,506	1,342,023
1906	1,373,611	827,846
1907	2,719,851	2,786,912
1908	1,907,402	1,412,367
1909	629,158	340,968
Total grain, flour,[a] and flaxseed.		
Average:		
1876–1880	15,395,635	8,161,461
1881–1885	10,958,104	6,967,208
1886–1890	10,532,147	6,681,030
1891–1895	11,345,464	8,781,384
1896–1900	23,279,156	17,227,357
1901–1905	18,240,677	13,385,000
1906–1909	19,233,661	10,611,314
1906	18,984,394	10,756,622
1907	16,157,251	8,607,043
1908	23,509,286	11,419,371
1909	18,283,715	11,662,220

[a] Flour reduced to terms of wheat by assuming 1 barrel of flour to be the product of 4½ bushels of wheat.

FACILITIES AFFORDED BY WATERWAYS.

DEPTH OF LAKE CHANNELS.

In 1871 the ordinary depth of water at the shallowest points between Buffalo and Lakes Superior and Michigan was reported to be no greater than 14 feet, while the Welland Canal was a few feet shallower. In 1909 the channels between the great western ports and Buffalo were 21 feet deep in the shallowest places at ordinary stages of the water, an increase in thirty-nine years of about 7 feet. The depths of the harbors of the larger ports have been made about the same as the passages connecting the various lakes. It may be said, as a rule, that a depth of at least 20 feet is to be found in the larger harbors of the lakes west of Niagara River and on all waterways connecting them, so that the vessels drawing about 19 feet are able to use these harbors and to navigate the waterways connecting them.

The value of deepening the channels and harbors may be roughly estimated from the additional carrying capacity which is permitted

to a boat for each additional inch in depth of water. At one of the largest ore docks at the head of the lakes an allowance of 80 tons (2,240 pounds each) of cargo is reported to be made for each additional inch of draft, after the boat is loaded down to draw about 14 or 15 feet. This applies to the largest bulk carriers. For instance, if a boat loaded with 7,000 tons draws 15 feet of water, it would take 960 more tons to make it draw 16 feet; and, with a draft of 20 feet, the vessel would carry, at the rate of 80 tons to the additional inch, 11,800 tons. There is a variation from time to time in the depth of water at the various passages, and the size of a maximum cargo varies accordingly.

At this rate, it may be roughly estimated that the improvements in channels and harbors of the Great Lakes, made during the period covered by this bulletin, 1871-1909, enable one of the largest lake vessels to carry in a single cargo approximately 6,000 tons more in the last year named than it could have carried in the first, assuming the size of the vessel to be the same in both years. Expressed in terms of wheat this increased tonnage, due to deepened channels, would equal 224,000 bushels in each of the largest cargoes.

The minimum depth of channels leading to the harbors of a large number of the United States ports on the Great Lakes and the channels of three of the important passages between lakes in 1909 is shown in Table 35. In a number of these places work has been done since the figures were reported, so that later returns might show greater depth in some cases.

TABLE 35.—*Minimum depth of channels leading to harbors at selected United States ports and of passages on the Great Lakes, 1909.*[a]

Port.	Depth of channel.	Port.	Depth of channel.
Lake Superior.	*Feet.*	*Lake Erie.*	*Feet.*
Two Harbors	21	Toledo	20
Duluth-Superior	21	Sandusky	20
Ashland	20	Cleveland	25
		Ashtabula	20
Lake Michigan.		Conneaut	20
		Erie	21
West shore:		Buffalo	22
Chicago	21	Erie Basin and Black Rock Harbor	22
South Chicago	20		
Racine	20	*Lake Ontario.*	
Milwaukee	21		
Manitowoc	20.5	Charlotte Harbor	17
Gladstone	22	Oswego	14
Menominee	18.5		
East shore:		PASSAGE.	
Benton Harbor	15		
St. Joseph	19.7	St. Marys Falls Canal (United States)	21
Grand Haven	19	Passage across Keweenaw Point	21
Ludington	20	Limekiln Shoals	23
Manistee	16		
Frankfort	19.3		
Lake Huron.			
Alpena	14.5		
Harbor Beach (refuge)	20		

[a] Compiled from reports of the Chief of Engineers, U. S. Army. The depths as given are subject to variations, due to natural conditions, of from 1 to more than 6 feet in the course of a year.

DIFFERENCES IN ALTITUDES OF VARIOUS LAKES.

The surface of Lake Superior is only 29 feet higher than that of Lake Erie, of which 21 feet is due to the rise at St. Marys Falls, and 8 feet to the difference in level between Lake Huron and Lake Erie. In contrast with this slight variation in altitude between Lake Superior and Lake Erie is the great drop of 327 feet between Lake Erie and Lake Ontario. One effect of these conditions is to confine the traffic of the largest lake vessels to routes west of Niagara Falls. In order to open Lake Ontario to this western traffic it would be necessary to enlarge the Welland Canal to one and one-half times its present depth, or to construct a new canal from 20 to 21 feet deep. One of the important items of expense in deepening this waterway would be the number and size of the locks necessary to lift and lower vessels a vertical distance of 327 feet. (See Table 36.)

TABLE 36.—*Altitudes of surface of Great Lakes above sea level.*[a]

Lake.	Altitude of surface above sea level.	Altitude of surface of each lake above that of—			
		Lake Michigan.	Lake Huron.	Lake Erie.	Lake Ontario.
	Feet.	*Feet.*	*Feet.*	*Feet.*	*Feet.*
Superior	602	21	21	29	356
Michigan	581			8	335
Huron	581			8	335
Erie	573				327
Ontario	246				

[a] Mean elevation for 49 years (1860-1908) above mean tide at New York City, as given in the Report of the Chief of Engineers, U. S. Army, 1909, part III, page 2501.

LENGTH OF SEASON OF NAVIGATION.

Navigation on the Great Lakes usually opens in April and closes in December. The number of days the St. Marys Falls canals were open during 1891–1909 was from 219 to 264 days a year, the average for 1891–1895 being 228, and for 1901–1905, 248 days a year. The Welland Canal was open 236 days a year in 1891–1895, and in 1901–1905 it was open ten days less than were the canals at St. Marys Falls. Erie Canal, during the period covered by Table 37, opened usually in the first week of May and closed in December. The average length of a season of navigation was 216 days for 1891–1905, and 211 days for 1901–1905.

TABLE 37.—*Dates of opening and closing of St. Marys Falls, Welland, and Erie canals, 1891-1909.*[a]

Year.	Date of opening.			Date of closing.			Number of days open.		
	St. Marys Falls.[b]	Welland.	Erie.	St. Marys Falls.[b]	Welland.	Erie.	St. Marys Falls.[b]	Welland.	Erie.
Average:									
1891–1895							228	236	216
1896–1900							240	236	215
1901–1905							248	238	211
1906–1909							240	247	208
1891	Apr. 27	Apr. 20	May 5	Dec. 7	Dec. 16	Dec. 5	225	241	216
1892	Apr. 18	Apr. 19	May 1	Dec. 6	Dec. 12	...do....	233	238	220
1893	May 1	Apr. 24	May 3	Dec. 5	Dec. 11	Nov. 30	219	232	212
1894	Apr. 17	Apr. 19	May 1	Dec. 6	Dec. ...	...do....	234	....	214
1895	Apr. 25	Apr. 25	May 3	Dec. 11	Dec. 12	Dec. 5	231	232	217
1896	Apr. 21	Apr. 27	May 1	Dec. 8	Dec. 15	Dec. 1	232	233	214
1897	...do....	Apr. 20	May 8	Dec. 14	...do....	...do....	238	240	209
1898	Apr. 11	Apr. 22	May 21	...do....	Dec. 13	Dec. 15	248	236	209
1899	Apr. 26	Apr. 24	Apr. 26	Dec. 20	Dec. 16	Dec. 3	239	237	222
1900	Apr. 19	Apr. 27	Apr. 25	Dec. 16	Dec. 15	Dec. 1	242	233	220
1901	Apr. 20	Apr. 22	May 7	Dec. 21	Dec. 14	Nov. 30	246	237	207
1902	Apr. 1	Apr. 21	Apr. 24	Dec. 20	Dec. 15	Dec. 4	264	239	224
1903	Apr. 2	Apr. 10	May 2	Dec. 15	...do....	Nov. 28	258	250	210
1904	May 5	May 2	May 5	Dec. 13	Dec. 17	Nov. 26	223	230	205
1905	Apr. 14	Apr. 24	May 4	Dec. 16	Dec. 15	Nov. 28	247	236	209
1906	Apr. 13	Apr. 16	May 2	Dec. 17	Dec. 18	...do....	249	247	211
1907	...do....	...do....	May 1	Dec. 11	Dec. 17	Dec. 10	243	246	224
1908	Apr. 27	Apr. 15	May 5	Dec. 13	Dec. 15	Nov. 30	231	245	210
1909	Apr. 20	...do....	May 15	Dec. 11	Dec. 20	Nov. 15	236	250	185

[a] Compiled from the Monthly Summary of Commerce and Finance, for St. Marys Falls canal; other data from annual reports of the Buffalo Chamber of Commerce and the New York Produce Exchange.
[b] Data for 1896–1903 refer to both United States and Canadian canals; other data to United States only.

GREAT LAKES THE MOST IMPORTANT INLAND WATERWAYS.

The freight traffic of the inland and coast waterways of the United States amounted in 1906 to nearly 178,000,000 tons, of which about 76,000,000 tons, or more than two-fifths, was carried on the Great Lakes and the St. Lawrence River. In the grain and flour traffic the share of this lake-and-river system was much greater in proportion, amounting to 63.7 per cent of the total grain carried on inland and coast waterways and 71.1 per cent of the flour. (Table 38.)

TABLE 38.—*Tonnage of freight carried on inland and coast waterways of the United States, 1906.*[a]

Article.	Great Lakes and St. Lawrence River.[b]		Other inland and coast waterways.		Total.
	Tons.[c]	*Per cent.*	*Tons.*[c]	*Per cent.*	*Tons.*[c]
Grain	3,689,329	63.7	2,102,683	36.3	5,792,012
Flour	1,334,979	71.1	541,876	28.9	1,876,855
All freight	75,610,690	42.6	101,910,109	57.4	177,520,799

[a] Compiled from Bulletin 91, Bureau of the Census: Transportation by Water. 1906.
[b] Shipments made in United States vessels, as reported by the Bureau of Statistics, Department of Commerce and Labor. Excluding freight carried in and around harbors by lighters and barges.
[c] Tons of 2,000 pounds.

SERVICE AND CAPACITY OF BOATS AND CARS.

TONNAGE BY LAKE AND BY RAIL.

The unit of quantity of traffic used in Table 39 is the ton-mile and is equivalent to 1 ton of 2,000 pounds transported 1 mile. With this unit as a basis, the magnitude of the freight traffic through St. Marys Falls canals may be compared with the railroad traffic in the Great Lakes region and in the entire United States. In 1898 the traffic through St. Marys Falls canals made nearly 18,000,000,000 ton-miles, the freight carried by railroads of Groups II, III, and VI, over 77,000,000,000 ton-miles, and the entire freight traffic of the United States, 114,000,000,000 ton-miles.

The relative importance of the freight carried through St. Marys Falls canals increased in later years as compared with the traffic on the railroads of the Great Lakes region, which is comprised roughly in Groups II, III, and VI.

Another marked difference between lake and rail transportation is the average distance carried. The great bulk of the lake traffic moves between Lake Erie ports and either Duluth or Chicago. The average distance that freight is carried on the lakes, or rather that part of the tonnage which passes through St. Marys Falls canals, has in each year, as far back at least as 1898, exceeded 800 miles, while the average length of haul on the railroads has been, since the fiscal year 1899 when data was first obtained by the Interstate Commerce Commission, from 238 to 252 miles. This average length of haul on railroads is computed by regarding all railroads as one system, thus obtaining the actual average distance between the point of origin and the point of delivery, regardless of the number of different railroads over which freight is moved. Such data are not available for the separate geographic groups, but a rough estimate for the Great Lakes region may be made from two columns in Table 39, which show the average length of haul as computed from averages for individual roads. For the entire United States the average length of haul on each railroad ranges from 130 to 135 miles, and in the three groups selected to represent the Great Lakes region, from 119 to 124 miles.

It will be noted that the average for the individual roads in the entire United States is from 108 to 117 miles less than the true average length of haul, so that, assuming the same difference for the Great Lakes region, it may be roughly estimated that a consignment of freight in that region on an average moves from 227 to 241 miles. A large quantity of short-distance local traffic would affect to a marked degree the average length of haul on a railroad, and such short-distance traffic is less common on the lakes. The great difference in the average distance carried for freight by lake and by rail is an indication

of the importance of the railroads compared with the lakes as carriers of short-distance shipments.

TABLE 39.—*Quantity of freight passing through St. Marys Falls canals and on railroads of the United States, and average distance carried, 1898-1908.*[a]

Year.	Traffic carried—			Average distance carried for traffic passing—			
	Through St. Marys Falls canals.	On railroads.		Through St. Marys Falls canals.	On railroads.		
					Average each road separately.		Average all roads as one system, entire United States.
		Great Lakes region.[b]	Entire United States.		Great Lakes region.[b]	Entire United States.	
	Ton-miles.	*Ton-miles.*	*Ton-miles.*	*Miles.*	*Miles.*	*Miles.*	*Miles.*
1898	17,892,000,000	77,372,000,000	114,078,000,000	842.6	122.1	132.1	....
1899	20,892,000,000	84,849,000,000	123,668,000,000	827.2	120.8	131.0	246.6
1900	21,179,000,000	96,655,000,000	141,597,000,000	825.9	120.3	130.9	242.7
1901	23,384,000,000	97,915,000,000	147,077,000,000	823.3	124.2	135.0	252.0
1902	29,756,000,000	103,929,000,000	157,289,000,000	827.4	119.4	131.0	239.1
1903	28,975,000,000	114,467,000,000	173,221,000,000	835.6	122.1	132.8	242.4
1904	26,609,000,000	114,019,000,000	174,522,000,000	843.5	122.4	133.2	244.3
1905	36,893,000,000	122,691,000,000	186,463,000,000	833.3	118.9	130.1	237.6
1906	43,597,000,000	141,725,000,000	215,878,000,000	842.4	120.0	132.3	240.9
1907	48,221,000,000	155,769,000,000	236,601,000,000	828.3	119.4	131.7	242.0
1908	34,854,000,000	[c]142,538,000,000	[c]218,382,000,000	842.0	[c]131.1	[c]143.8	[c]253.9

[a] Figures for traffic through St. Marys Falls canals were compiled from the Monthly Summary of Commerce and Finance and refer to calendar years; figures for other traffic were compiled from Statistics of Railways in the United States and refer to years ending June 30.

[b] Consisting of Groups II, III, and VI. These three groups, as determined by the Interstate Commerce Commission, are made up as follows: Group II: New York (east of Buffalo), Pennsylvania (east of Pittsburg), New Jersey, Delaware, Maryland, and the northern part of West Virginia; Group III: New York (west of Buffalo), Pennsylvania (west of Pittsburg), Ohio, Indiana, and the southern peninsula of Michigan; Group VI: Northern peninsula of Michigan, Wisconsin, Illinois, Minnesota, Iowa, Missouri (north of Missouri River), North Dakota (east of Missouri River), and South Dakota (east of Missouri River).

[c] Excluding returns for switching and terminal companies.

INCREASE IN SIZE OF LAKE VESSELS.

During the decade beginning 1881 a striking increase took place in the size of vessels built on the Great Lakes. In 1876-1880 the average gross measurement of vessels built was 133 tons of 100 cubic feet each. In 1881-1885 the average increased to 245 tons and in the following five-year period to 450 tons. The next great increase occurred during 1896-1900 when the average gross measurement was 861 tons, followed in 1901-1905 by 1,119 tons. The tendency to increase the size of these carriers continued and in 1906-1909 the average reached 1,232 tons. For the entire United States the average for all vessels built increased from 173 tons in 1871-1875 to 314 tons gross measurement in 1901-1905, and the average for 1906-1909 was 343 tons. (See Table 40.)

TABLE 40.—*Number and gross tonnage of vessels built and documented on northern lakes and in the entire United States, 1871-1909.*[a]

Year ending June 30—	On northern lakes.			Entire United States.		
	Number.	Gross tonnage.		Number.	Gross tonnage.	
		Total.	Average per vessel.		Total.	Average per vessel.
Average:		*Tons.*	*Tons.*		*Tons.*	*Tons.*
1871-1875	313	60,563	193	1,821	314,378	173
1876-1880	112	14,900	133	1,087	193,225	178
1881-1885	178	43,554	245	1,171	242,546	207
1886-1890	175	78,719	450	940	197,849	210
1891-1895	149	67,087	450	1,053	204,674	194
1896-1900	114	98,156	861	1,057	266,723	252
1901-1905	130	145,472	1,119	1,334	419,466	314
1906-1909	193	237,782	1,232	1,270	435,596	343
1906	204	265,271	1,300	1,221	418,745	343
1907	177	244,291	1,380	1,157	471,332	407
1908	216	341,165	1,579	1,457	614,216	422
1909	174	100,402	577	1,247	238,090	191

[a] Compiled from reports of the Commissioner of Navigation and from the Statistical Abstract of the United States. Gross tonnage includes the entire cubical capacity of a vessel, as determined by official measurement, and expressed in tons of 100 cubic feet.

SIZE OF VESSELS TRADING AT VARIOUS PORTS.

A record is made of the net registered tonnage of a vessel each time it clears officially from a lake port, in the domestic trade as well as in the foreign trade. The reports of clearances in the domestic trade give a basis for computing the average carrying capacity of the vessels taking part in domestic commerce at each lake port. The marked difference shown in Table 41 between the averages for Lake Ontario ports and those of Lakes Superior, Michigan, and Erie is due partly to the fact that the large vessels, whose chief business lies in the coal, ore, and grain traffic between Lake Erie and the west, do not often pass from Lake Erie to Lake Ontario. Another reason for the difference, which also seems to explain the relatively low figures for clearances from Lake Huron ports, is the fact that the large bulk carriers as well as the largest package freight vessels are engaged in service between terminal points on Lakes Erie, Michigan, and Superior, carrying ore and grain eastward and southward, and coal northward and westward. In such traffic, few, if any, large vessels would have occasion to take out clearance papers at a port on Lake Huron.

TABLE 41.—*Average net registered tonnage of vessels clearing in domestic trade from ports on the Great Lakes, 1906–1909.*[a]

Port.	Year ending June 30—			
	1906.[b]	1907.	1908.	1909.
Lake Superior and St. Marys River.	*Tons.*	*Tons.*	*Tons.*	*Tons.*
Ashland	1,320	1,967	2,422	2,322
Duluth	2,437	2,740	2,728	2,930
Hancock and Houghton	1,526	1,601	1,815	2,071
Lake Linden	1,658	2,028	2,127	2,051
Marquette	1,801	2,210	2,326	2,503
Sault Ste. Marie	952	1,006	1,081	1,087
Superior and West Superior	2,416	2,899	2,959	3,074
Two Harbors	3,018	2,807	3,283	3,492
Washburn	313	1,158	1,112	1,102
Average Lake Superior, etc	2,088	2,498	2,601	2,802
Lake Huron, St. Clair River, and Lake St. Clair.				
Alpena	640	728	907	1,036
Cheboygan	650	652	622	587
Detour	895	875	692	759
Harbor Beach	1,078	1,011	992	1,021
Huron	1,614	1,862	1,974	2,502
Kewaunee	884	897	951	890
Mackinac	801	619	387	497
Port Huron	643	623	592	589
St. Clair	347	531	511	648
Average Lake Huron, etc	809	837	688	732
Lake Michigan and Straits of Mackinac.				
Benton Harbor	705	764	812	762
Charlevoix	895	844	896	970
Chicago and South Chicago	1,150	1,222	1,207	1,270
Escanaba	1,577	1,688	1,865	2,059
Frankfort	794	868	949	905
Gary	....	....	....	3,180
Gladstone	756	959	1,001	1,087
Grand Haven	1,112	1,163	1,207	1,232
Green Bay	431	533	565	531
Ludington	1,167	1,201	1,241	1,326
Manistee	515	542	640	676
Manistique	943	1,012	929	665
Manitowoc	1,066	1,145	1,176	1,230
Marinette	340	255	206	210
Menominee	384	414	361	347
Michigan City	870	572	606	832
Milwaukee	1,235	1,333	1,364	1,431
Muskegon	680	697	753	828
Peshtigo	1,337	1,248	1,386	1,308
Racine	759	844	769	724
St. Joseph	846	878	918	864
Sheboygan	651	718	684	702
South Haven	883	796	805	772
Sturgeon Bay	295	272	268	262
Average Lake Michigan, etc	1,016	1,085	1,077	1,156
Lake Erie and Detroit River.				
Ashtabula	2,601	2,694	2,903	3,394
Buffalo	1,946	2,098	2,136	2,293
Cleveland	1,620	1,724	1,763	1,842
Conneaut	2,883	3,700	3,581	3,839
Detroit	827	782	800	786
Erie	2,054	2,247	2,030	2,023
Fairport	2,348	2,698	2,645	2,636
Kelley's Island	351	375	387	415
Lorain	2,482	2,626	3,204	3,446
Marine City	391	408	382	414
North Tonawanda	702	726	757	980

[a] Compiled from the Statistical Abstract of the United States. Net registered tonnage includes the entire inner cubical capacity of a vessel after deducting space used for crew accommodations, propelling power, and such items as steering gear, chart house, supplies, sails, donkey engine (for pump), and accommodations for master of vessel, as determined by official measurement and expressed in tons of 100 cubic feet.

[b] Includes data for vessels carrying merchandise in transit between the United States and Canada.

TABLE 41.—*Average net registered tonnage of vessels clearing in domestic trade from ports on the Great Lakes, 1906-1909*—Continued.

Port.	Year ending June 30—			
	1906.	1907.	1908.	1909.
Lake Erie and Detroit River—Continued.	*Tons.*	*Tons.*	*Tons.*	*Tons.*
Sandusky	668	831	944	918
Toledo	1,298	1,535	1,434	1,619
Tonawanda	587	614	879	1,095
Average Lake Erie, etc	1,646	1,766	1,703	1,913
Lake Ontario and St. Lawrence River.				
Charlotte	773	802	743	775
Ogdensburg	1,019	840	770	748
Oswego	400	549	610	506
Average Lake Ontario, etc	855	771	725	704
Other ports	452	477	524	482
Average Great Lakes	1,237	1,344	1,271	1,413

BOAT LOADS OF GRAIN.

From the records of the Duluth Board of Trade it appears that 400,000 bushels is not an unusual cargo of grain. November 20, 1908, a vessel cleared from Duluth harbor with 321,000 bushels of flaxseed and 141,374 bushels of oats, making a total cargo of 462,374 bushels. The same vessel cleared November 4, 1908, with 413,930 bushels of wheat, and May 2 of the same year with 212,000 bushels of wheat and 195,000 bushels of flaxseed. On November 22, 1907, a vessel sailed from Duluth with 415,800 bushels of wheat, and another on December 3, 1907, with 424,000 bushels. A number of other bulk carriers are credited with cargoes ranging from 300,000 to 400,000 bushels, while the small cargoes of this class of carriers usually range from 100,000 to 200,000 bushels. According to the lake weighmaster at Buffalo, the average cargo of grain received at that port in 1908 was 147,500 bushels.

Consignments of grain carried by package-freight boats are considerably smaller than the cargoes of the bulk-freight carriers, but are nevertheless of no small importance. May 24, 1909, one package-freight vessel left Duluth with 50,000 bushels of spring wheat and another vessel of the same line with 30,000 bushels. In November, 1908, a partial cargo of wheat consigned to Ogdensburg amounted to 77,000 bushels and to the same port in October, 1908, another vessel carried 59,000 bushels. Two other consignments, one of 51,000 and another of 56,500 bushels, were shipped to the same port in this month. A package-freight boat is constructed to carry miscellaneous commodities on its several decks and to stow grain in the hold. Many of the lines of this class of vessels are operated in connection with rail-

roads, and serve as links in the lines of transportation between the Atlantic and Pacific coasts.

The usual type of vessel used in the ore, coal, and grain traffic is somewhat similar in form to a canal boat, and has its machinery and cabins in relatively small spaces at the bow and stern, thus leaving a long clear hold for cargo. When the hatches are removed, the entire hold is open, except for the narrow strips on which they rest.

COST OF VESSELS.

According to statistics compiled by the Bureau of the Census in Bulletin 71, an average cost of building barges in the United States was $2,992 each, or $13 per gross ton measurement. At this rate it would cost at the rate of 17 cents per bushel to provide carrying capacity in barges for wheat. In the case of canal boats for the State of New York the average cost of construction per carrying capacity of 1 bushel of wheat appears to be 20 cents, and for all canal boats in the United States 22 cents. For steel vessels on the Great Lakes the average cost of construction for each unit of carrying capacity of 1 bushel of wheat is $1. According to these figures, to provide for transporting a given quantity of freight it will cost one-fifth as much to build canal boats as steel lake vessels, and still less to build barges which are larger than canal boats. The average gross tonnage of the New York canal boats which enter into the computation above is 201, and of the barges 223 gross tons, while the average gross tonnage of the steel vessels on the Great Lakes, for which cost of construction was reported by the census, is 2,892 gross tons.

SOME EXPENSES OF OPERATION OF LAKE BOATS.

According to a prominent representative of a line of lake steamers, the expenses which a vessel incurs in carrying wheat between Chicago and Buffalo amount to five-eighths of 1 cent a bushel. Among the items included in this expense are charges for loading and unloading, weighing at both origin and destination, and port charges. The same authority estimates the cost of operating a boat of approximately 250,000 bushels capacity as from $7 to $9 an hour. Another representative of a large line estimates the average cost of operating one of the largest boats, whose capacity is possibly 400,000 bushels of wheat, at $250 per day.

The time of transit from either Duluth or Chicago to Buffalo for lake vessels is from three to five days, or about one-half the time taken by canal boats to go from Buffalo to tide water. The distance by canal and river from Buffalo to tide water, at New York City, is approximately one-half the distance by lake from Duluth or Chicago to

Buffalo. This difference in rates of speed is due not altogether to differences in motive power of the two types of vessels, but also to the nature of canal navigation, which makes low rates of speed necessary.

RAILROAD MILEAGE AND EQUIPMENT.

More than two-fifths of the railroad mileage of the United States during the ten years ending June 30, 1907, has been located in the geographical Groups II, III, and VI. The States included in these groups, as classified by the Interstate Commerce Commission, are listed in note *b*, Table 39, and, for the purposes of the comparison made in this paragraph, may be regarded as the Great Lakes region. The mileage in these groups increased from 87,000 on June 30, 1898, to more than 101,000 miles June 30, 1908. In these eleven years there was in the region consisting of the three groups mentioned from 57 to 61 per cent of the entire number of locomotives, and from 64 to 70 per cent of the number of freight cars in the United States. In the official reports of the Interstate Commerce Commission most of the locomotives reported are classified according to service, but there are quite a number unclassified. On account of those unclassified, the actual number of locomotives in freight service is not obtainable from existing statistics; so in Table 42 a total of locomotives, including those in passenger and switching service, as well as freight service, is taken.

TABLE 42.—*Miles of single track and number of locomotives and freight cars on railroads of the Great Lakes region and in the entire United States, 1898–1908.*[a]

On June 30—	Mileage for which operations are reported.[b]			Locomotives.			Freight cars.		
	Entire United States, miles.	Groups II, III, and VI.[c]		Entire United States, number.	Groups II, III, and VI.[c]		Entire United States, number.	Groups II, III, and VI.[c]	
		Miles.	Per cent of United States.		Number.	Per cent of United States.		Number.	Per cent of United States.
1898	184,648	87,288	47.3	36,234	22,199	61.3	1,248,826	870,977	69.7
1899	187,535	88,032	46.9	36,703	22,341	60.9	1,295,510	905,648	69.9
1900	192,556	90,180	46.8	37,663	22,984	61.0	1,365,531	952,467	69.8
1901	195,562	91,014	46.5	39,584	23,888	60.3	1,464,328	1,017,579	69.5
1902	200,155	92,078	46.0	41,225	24,705	59.9	1,546,101	1,059,931	68.6
1903	205,314	93,385	45.5	43,871	26,126	59.6	1,653,782	1,119,709	67.7
1904	212,243	95,577	45.0	46,743	27,675	59.2	1,692,194	1,128,004	66.7
1905	216,974	97,161	44.8	48,357	28,425	58.8	1,731,409	1,143,708	66.1
1906	222,340	99,490	44.7	51,672	30,594	59.2	1,837,914	1,205,255	65.6
1907	227,455	100,992	44.4	55,388	32,134	58.0	1,991,557	1,290,036	64.8
1908	[d]230,494	[d]100,999	[d]43.8	57,698	33,074	57.3	2,100,784	1,344,166	64.0

[a] Compiled from Statistics of Railways in the United States, published by the Interstate Commerce Commission.
[b] Constituting in 1898–1907, 99 per cent of the total mileage of the United States.
[c] See note *b*, Table 39, p. 60.
[d] Excluding returns for switching and terminal companies.

CAPACITY OF CARS.

The average carrying capacity of a box car about 1871 was approximately 10 tons, or 20,000 pounds. Eight or ten years later a movement began to increase the maximum load to 30,000 or even 40,000 pounds. On June 30, 1902, according to the returns of the Interstate Commerce Commission, the average carrying capacity of a box car on all railroads in the United States was 27 tons, and in 1908 this had increased to 32 tons. The average capacity of box cars, the kind regularly used for grain, in 1908 was more than three times that in 1871.

The actual weight of carloads of grain is reported for an important part of the grain trade, that which reaches Duluth and Minneapolis; of the cars weighed at Minneapolis by state authorities during the years ending August 31, 1890–1908, the average contents of a car of wheat in 1890 was 582 bushels and in 1908, 1,097 bushels. The averages for corn were 647 bushels in 1890 and 1,055 bushels in 1908; oats, 987 and 1,560 bushels, respectively, while a carload of flaxseed increased on an average from 543 bushels in 1890 to 1,082 in 1908.

The average carload at Duluth also showed a considerable increase in 1908 over 1896. (See Tables 43 and 44.)

According to the chief grain inspector of Illinois, the average carload of wheat received at Chicago and inspected by state authorities for the year ending August 31, 1907, was 1,232 bushels, and the average carload shipped from Chicago was 1,132 bushels. Of the corn received and inspected there, the carloads averaged 1,225 bushels, and those shipped 1,195; oats, 1,764 and 1,604 bushels, respectively; rye, 1,180 and 1,077 bushels, respectively, while the barley, which was received and inspected, averaged 1,214 bushels per car, and that shipped and inspected averaged 1,418 bushels per car. While the average capacity of the box cars in the United States in 1908 was 32 tons, or about 1,067 bushels of wheat, a considerable number of box cars were built to carry 80,000 and even 100,000 pounds.

Variations in average weights of carloads from month to month may be illustrated by statistics of receipts at Duluth during 1907 and 1908. In both years the December receipts showed average carload weights far above those for any other month. In December, 1907, the average number of bushels of wheat per car received at Duluth was 1,418; the next highest average being for August, 1,389 bushels, and the lowest for September, which was 908 bushels. In 1908 the average bushels per car received at Duluth was 1,794 bushels in December and the lowest average was 768 bushels for the month of August.

Comparing the capacities of cars and lake boats, it would require 240 carloads of 100,000 pounds each to furnish a full cargo for one of

the largest grain-carrying lake vessels; and it would take 124 carloads of wheat of 1,194 bushels each, the average for Duluth's receipts during the year 1907–8, to supply a cargo of 147,500 bushels, the average for Buffalo's receipts in 1908. This cargo would be more than enough to load 18 canal boats at Buffalo, while one of the 400,000-bushel cargoes would require 50 canal boats to carry it to tidewater.

TABLE 43.—*Average contents per car of grain and flaxseed received at Minneapolis during the years ending August 31, 1890–1908.*[a]

Year ending Aug. 31—	Barley.		Corn.		Oats.		Rye.		Wheat.		Flaxseed.	
	Pounds per car.	Bushels per car.	Pounds per car.	Bushels per car.	Pounds per car.	Bushels per car.	Pounds per car.	Bushels per car.	Pounds per car.	Bushels per car.	Pounds per car.	Bushels per car.
1890	31,920	665	36,232	647	31,584	987	31,136	556	34,920	582	30,408	543
1893	35,760	745	39,816	711	33,088	1,034	39,760	710	39,480	658	33,936	606
1894	34,608	721	36,904	659	32,416	1,013	35,616	636	38,940	649	34,272	612
1896	38,880	810	37,128	663	38,016	1,188	37,912	677	41,640	694	36,344	649
1897	37,008	771	37,072	662	36,480	1,140	38,696	691	42,360	706	37,408	668
1898	34,944	728	41,552	742	35,744	1,117	38,472	687	43,260	721	38,976	696
1899	42,000	875	46,032	822	39,840	1,245	42,336	756	46,380	773	43,232	772
1900	42,672	889	57,904	1,034	41,152	1,286	42,112	752	48,420	807	46,312	827
1901	43,488	906	49,224	879	42,784	1,337	43,568	778	50,160	836	38,360	685
1902	44,928	936	48,440	865	42,816	1,338	44,744	799	52,920	882	44,296	791
1903	47,376	987	51,352	917	45,600	1,425	46,480	830	55,440	924	50,456	901
1904	49,152	1,024	53,256	951	45,728	1,429	45,976	821	55,680	928	51,744	924
1905	50,304	1,048	54,432	972	48,288	1,509	46,536	831	55,500	925	50,568	903
1906	53,856	1,122	54,152	967	51,840	1,620	50,176	896	59,280	988	58,296	1,041
1907	54,576	1,137	58,128	1,038	51,648	1,614	51,576	921	62,760	1,046	57,680	1,030
1908	58,704	1,223	59,080	1,055	49,920	1,560	54,376	971	65,820	1,097	60,592	1,082

[a] Compiled from the annual reports of the chief inspector of grain of Minnesota. Number of bushels computed from stated number of pounds by assuming 1 bushel of barley equal to 48 pounds; corn, 56; oats, 32; rye, 56; wheat, 60; and flaxseed, 56 pounds.

TABLE 44.—*Average contents per car of grain and flaxseed received at Duluth during the years ending August 31, 1896–1908.*[a]

Year ending Aug. 31—	Barley.		Corn.		Oats.		Rye.		Wheat.		Flaxseed.	
	Pounds per car.	Bushels per car.	Pounds per car.	Bushels per car.	Pounds per car.	Bushels per car.	Pounds per car.	Bushels per car.	Pounds per car.	Bushels per car.	Pounds per car.	Bushels per car.
1896	39,570	824	35,722	638	38,859	1,214	36,637	654	40,196	670	35,370	632
1897	37,752	786	39,878	712	37,067	1,158	39,644	708	41,979	700	38,374	685
1898	37,232	776	30,146	538	40,177	1,256	37,579	671	43,415	724	40,896	730
1899	43,492	906	53,736	960	46,079	1,440	40,967	732	48,940	816	44,515	795
1900	45,956	957	48,374	864	42,142	1,317	43,665	780	51,329	855	47,274	844
1901	46,822	975	48,642	869	44,915	1,404	43,904	784	50,857	848	45,580	814
1902	48,610	1,013	49,334	881	41,756	1,305	46,348	828	55,214	920	52,142	931
1903	50,077	1,043	49,241	879	43,554	1,361	39,759	710	57,905	965	55,634	993
1904	52,012	1,084	53,314	952	48,233	1,507	46,568	832	57,377	956	57,349	1,024
1905	50,335	1,049	55,863	998	50,695	1,584	47,182	843	57,742	962	58,849	1,061
1906	55,775	1,162	51,987	928	52,222	1,632	50,934	910	61,100	1,018	64,712	1,156
1907	53,465	1,114	58,046	1,037	51,596	1,612	56,931	1,017	68,530	1,142	67,290	1,202
1908	59,155	1,232	61,494	1,098	51,138	1,598	58,482	1,044	71,646	1,194	69,684	1,247

[a] Compiled from the annual reports of the chief inspector of grain of Minnesota. Number of bushels computed from stated number of pounds by assuming 1 bushel of barley equal to 48 pounds; corn, 56; oats, 32; rye, 56; wheat, 60; and flaxseed, 56 pounds.

COMPARATIVE EFFICIENCY OF FREIGHT CARS AND LAKE BOATS.

According to reports of the Interstate Commerce Commission, the carrying capacity of freight cars on the railways of the United States ranged from 42,000,000 tons (2,000 pounds each) on June 30, 1902, to 73,000,000 tons on June 30, 1908, while the ton-miles of freight traffic increased from 157,000,000,000 in the fiscal year ending June 30, 1902, to 218,000,000,000 in the fiscal year 1908. According to these figures the average ton-miles of traffic per ton of carrying capacity was 3,719 ton-miles for the fiscal year 1902, according to Table 45, and 3,530 for 1907, and 2,988 ton-miles for 1908.

Corresponding statistics for the Great Lakes are not available for making comparison with these average rates of efficiency of freight cars, but it is possible to compute minimum rates of efficiency of lake vessels. The carrying capacity of lake vessels may be estimated roughly as follows: Taking the net registered tons as reported by the Commissioner of Navigation, assume gross registered tonnage to be one-half greater, and the dead-weight carrying capacity, in long tons, to be one and one-half times the number of gross tons. By this method it is estimated that the total carrying capacity of merchant vessels registered on northern lakes, June 30, 1902, amounted to about 4,600,000 tons (of 2,000 pounds) and on June 30, 1907, to 5,900,000 tons. These figures include an unknown, but probably large, amount of space in vessels devoted to passenger accommodations and which can not be used for freight. This is to be borne in mind in connection with the estimated average efficiency to be made presently. In the absence of complete figures for the entire traffic of the Great Lakes, the statistics for ton-miles of traffic are taken for trade passing through St. Marys Falls canals. While this movement constitutes one of the most important parts, if not the largest part, of the Great Lakes freight movement, there is, in addition to this, the trade between Chicago and Lake Erie, between Detroit and Lake Erie, and the local trade carried on between many neighboring ports.

By dividing the carrying capacity of all the merchant vessels, which, as has been noted, is too large, into the total number of ton-miles of traffic which passes through the St. Marys Falls canals, which figure is far too small to represent the total lake traffic, the quotient is found to range from 6,000 to 8,000 ton-miles of freight per unit of carrying capacity. It is plain that these figures are far below the true average for the Great Lakes, but they nevertheless serve to illustrate that the average service performed by a lake boat per unit of carrying capacity is far greater, sometimes more than double, that rendered by the average freight car in the United States.

TABLE 45.—*Average quantity of freight carried per unit of car capacity in the United States, 1902–1908.*[a]

Year ending June 30—	Capacity of freight cars June 30 (short tons).	Ton-miles of traffic.	Average ton-miles per ton capacity.
1902	42,292,977	157,289,370,053	3,719
1903	48,530,281	173,221,278,993	3,569
1904	50,759,133	174,522,089,577	3,438
1905	53,255,083	186,463,109,510	3,501
1906	59,059,302	215,877,551,241	3,655
1907	67,033,324	236,601,390,103	3,530
1908	73,086,522	[b] 218,381,554,802	[b] 2,988

[a] Compiled from Statistics of Railways in the United States.
[b] Excluding returns for switching and terminal companies.

FREIGHT RATES.

RECEIPTS PER TON-MILE BY LAKE AND BY RAIL.

The average receipts per ton per mile are what is commonly called the average ton-mile rate, and each rate is influenced by a number of different conditions. A lower rate in one region than another, or in one year than in another, may be due to a relatively larger amount of freight on which low rates are paid rather than to any change made in specific rates themselves. It will be noted in Table 46 that the principal railroads east of Chicago have lower average receipts for freight per ton-mile than the principal railroads west of that city. This may be due largely to the fact that the 10 roads selected to represent the rail traffic east of Chicago and near the Lakes carry a large amount of such low-class freight as coal, compared with the relatively larger amount of high-class freight carried by the 10 selected roads west of Chicago.

The predominance of iron ore and of coal in the traffic passing through St. Marys Falls canals helps considerably to reduce the ton-mile rate of freight receipts to a low point, but it is not entirely responsible for the vast difference between the average rate for water transportation and the corresponding averages for rail traffic as shown in Table 46. For the average amount received by the railroads of Groups II, III, and VI for carrying 1 ton of freight 1 mile, in the fiscal year 1908, 9½ tons could have been carried on the Lakes.

Without taking into account any difference arising on account of varying relative amounts of high-class and low-class freight on railroads as compared with the Lakes, rail transportation appears to be many times as expensive as that afforded by lake boats. In this connection it should be noted that the highways over which the lake traffic moves are free to the carriers, and their maintenance is borne by the public through taxes, while the railroads are built and

maintained at private expense, their cost being charged ultimately to the traffic carried.

TABLE 46.—*Average receipts per ton per mile for freight traffic through St. Marys Falls canals and on railroads of the United States, 1898–1908.*[a]

Year.	For traffic carried— Through St. Marys Falls canals.	On railroads in— Great Lakes region. Selected railroads near the Lakes. West of Chicago.[b]	East of Chicago.[c]	Groups II, III, and VI.[d]	Entire United States.
	Cent.	*Cent.*	*Cent.*	*Cent.*	*Cent.*
1898	0.079	0.879	0.559	0.676	0.753
1899	.105	.884	.522	.643	.724
1900	.118	.857	.542	.654	.729
1901	.099	.836	.565	.670	.750
1902	.089	.833	.587	.681	.757
1903	.092	.822	.602	.687	.763
1904	.081	.828	.619	.675	.780
1905	.085	.800	.603	.687	.766
1906	.084	.785	.594	.671	.748
1907	.080	.791	.598	.673	.759
1908	.069	.775	.595	[e].658	[e].754

[a] See note *a*, Table 39, p. 60.
[b] Comprising the following railroads: Chicago, Milwaukee and St. Paul; Chicago and Northwestern (east of Missouri River); Chicago, Burlington and Quincy; Illinois Central; Great Northern; Chicago, Rock Island and Pacific; Northern Pacific; Wabash (west of Danville, Ill.); Minneapolis, St. Paul and Sault Ste. Marie; Chicago and Eastern Illinois.
[c] Comprising the following railroads: Pennsylvania Company; Lake Shore and Michigan Southern; Baltimore and Ohio; Michigan Central; Pittsburg and Lake Erie; Cleveland, Cincinnati, Chicago and St. Louis; Erie; Pittsburg, Cincinnati, Chicago and St. Louis; New York, Chicago and St. Louis; New York Central and Hudson River (west of New England).
[d] See note *b*, Table 39, p. 60.
[e] Excluding returns for switching and terminal companies.

COMPARISON OF RAIL AND WATER RATES, CHICAGO TO NEW YORK.

Rates charged by lake boats for carrying grain are subject to fluctuation with changes in market conditions. A plentiful supply of boats and a scarcity of grain to be shipped would tend to make rates low, while the reverse of this condition would be apt to raise rates. Quotations of these freight rates on grain by lake are supposed to be based upon actual transactions, so that reports made by various authorities may be expected to be approximately the same, taking no account of slight variations due to different methods of computing averages from individual quotations and also to varying degrees of completeness in obtaining returns for all shipments. Variations of minor importance are also to be expected in quotations of freight rates by canal and even by rail. Hence, in comparing one average rate with another, it may sometimes be desirable to compute a mean of the quotations of different authorities. This is done in Table 47, which was compiled from the annual reports of the Chicago Board of Trade and of the New York Produce Exchange,

and in Table 48, which was made from these authorities and also from the annual reports of the Buffalo Chamber of Commerce.

The cheapness of water as compared with rail transportation is illustrated in Table 47, which shows rates on wheat from Chicago to New York over three routes, one by rail only, another by lake to Buffalo and thence by rail to New York, and the third route being by lake to Buffalo and thence by Erie Canal to New York. During 1871–1875 the mean all-rail rate exceeded the rate by lake and canal by 10.6 cents per bushel, and in 1901–1905 this excess amounted to 6.39 cents per bushel. This excess would be reduced somewhat in 1898 and subsequent years if account were taken of charges for transfer at Buffalo from lake to canal. The elevators, during the period beginning with 1908, charged one-half of 1 cent per bushel for transferring grain.

In earlier years there was a greater difference than at present between rates by canal and by rail from Lake Erie to tidewater. The excess of rail over canal rates is shown in Table 47 by the figures for excess of lake-and-rail over lake-and-canal rates. In 1882 and preceding years tolls were charged on the Erie Canal, but they were paid by the boatmen and were included in freight rates. In 1871–1874 the toll charged on wheat on the Erie Canal from Buffalo to the eastern terminus of the canal was 3.10 cents per bushel in currency (from 2.72 to 2.79 cents in gold); in 1875 and 1876 the toll was reduced to 2 cents currency (1.74 to 1.80 cents gold); and in 1877 the charge was further reduced to 1 cent per bushel (practically the same in gold as in currency), which rate remained in force until 1883, when tolls were abolished on the canal.

TABLE 47.—*Rail and water freight rates per bushel on wheat from Chicago to New York, 1871–1909.*

[All values are gold.]

Year.	Rate.[a]			Excess of all-rail rate over rate for—		Excess of rate for lake and rail over rate for lake and canal.
	Lake and canal.[b]	Lake and rail.	All rail.	Lake and canal.	Lake and rail.	
Mean:	*Cents.*	*Cents.*	*Cents.*	*Cents.*	*Cents.*	*Cents.*
1871–1875[c]	15.88	19.70	26.48	10.60	6.78	3.82
1876–1880	10.65	13.18	17.88	7.23	4.70	2.53
1881–1885	7.51	10.38	14.40	6.89	4.02	2.87
1886–1890	7.52	10.48	15.06	7.54	4.58	2.96
1891–1895	5.75	7.70	13.75	8.00	6.05	1.95
1896–1900	5.04	6.20	11.50	6.46	5.30	1.16
1901–1905	5.21	5.86	11.60	6.39	5.74	.65
1906–1909	5.99	6.89	10.86	4.87	3.97	.90
1906	5.98	6.38	10.35	4.37	3.97	.40
1907	6.66	7.03	11.10	4.44	4.07	.37
1908	6.02	6.96	11.15	5.13	4.19	.94
1909	5.30	7.18	10.83	5.53	3.65	1.88

[a] Mean of quotations given in the annual reports of Chicago Board of Trade and New York Produce Exchange.
[b] Beginning with 1898, excluding charges for transfer at Buffalo.
[c] New York Produce Exchange only.

REDUCTION IN FREIGHT CHARGES BY LAKE AND CANAL.

Reports of the Chicago Board of Trade, of the Buffalo Chamber of Commerce, and of the New York Produce Exchange quote freight rates on grain from Chicago to Buffalo. A mean of these three sets of quotations, as has been made in Table 48, may be taken as slightly more representative of changes in rates than is any single set of quotations. According to this table, the mean rate per bushel on wheat from Chicago to Buffalo for 1901–1905 was 1.5 cents per bushel, or less than one-fourth of the mean for 1871–1875. A similar comparison is made of rates on wheat by canal from Buffalo to New York, as quoted by the Buffalo Chamber of Commerce and the New York Produce Exchange. Figures based upon both sets of quotations show 3.7 cents per bushel for 1901–1905 as compared with 9.8 cents in 1871–1875. All freight rates quoted here and throughout this bulletin have been reduced to gold for the period 1862–1878, the original quotations being apparently in currency.

TABLE 48.—*Mean freight rates per bushel on wheat by lake from Chicago to Buffalo and by canal from Buffalo to New York, 1871–1909; different authorities compared.*

[All values are gold.]

Year.	Chicago to Buffalo by lake.				Buffalo to New York by canal.		
	Chicago Board of Trade.[a]	Buffalo Chamber of Commerce.	New York Produce Exchange.	Mean.	Buffalo Chamber of Commerce.	New York Produce Exchange.	Mean.
Mean:	*Cents.*	*Cents.*	*Cents.*	*Cents.*	*Cents.*	*Cents.*	*Cents.*
1871-1875	6.3	....	6.1	6.2	9.8	9.8	9.8
1876-1880	4.0	3.9	4.0	4.0	6.5	6.5	6.5
1881-1885	2.8	2.7	2.7	2.7	4.6	4.6	4.6
1886-1890	3.1	3.0	3.0	3.0	4.3	4.2	4.2
1891-1895	1.9	1.9	1.9	1.9	3.4	3.4	3.4
1896-1900	....	1.8	1.9	1.8	3.0	3.0	3.0
1901-1905	1.6	1.5	1.5	1.5	3.7	3.7	3.7
1906-1909	1.4	1.4	1.4	1.4	4.5	4.6	4.6
1871	6.8	....	6.8	6.8	11.3	11.3	11.3
1872	10.2	9.9	10.2	10.1	11.6	11.6	11.6
1873	7.6	6.9	6.7	7.1	10.0	10.2	10.1
1874	3.8	3.5	3.6	3.6	9.0	9.1	9.0
1875	3.3	3.0	3.0	3.1	6.9	7.0	7.0
1876	2.8	2.6	2.6	2.7	5.9	6.0	6.0
1877	3.7	3.5	3.6	3.6	7.1	7.2	7.2
1878	3.2	3.0	3.1	3.1	6.0	6.0	6.0
1879	4.6	4.7	4.7	4.7	6.8	6.9	6.8
1880	5.8	5.7	5.8	5.8	6.5	6.5	6.5
1881	3.5	3.2	3.4	3.4	4.7	4.8	4.8
1882	2.6	2.5	2.5	2.5	5.4	5.4	5.4
1883	3.6	3.5	3.4	3.5	4.9	5.0	5.0
1884	2.2	2.1	2.2	2.2	4.2	4.1	4.2
1885	2.2	2.0	2.0	2.1	3.8	3.9	3.8
1886	3.9	3.6	3.7	3.7	5.0	5.0	5.0
1887	4.2	4.1	4.1	4.1	4.6	4.4	4.5
1888	2.8	2.7	2.6	2.7	3.4	3.4	3.4
1889	2.6	2.5	2.5	2.5	4.8	4.4	4.6
1890	2.0	1.9	2.0	2.0	3.8	3.9	3.8

[a] Computed from weekly quotations.

TABLE 48.—*Mean freight rates per bushel on wheat by lake from Chicago to Buffalo and by canal from Buffalo to New York, 1871-1909, etc.*—Continued.

Year.	Chicago to Buffalo by lake.				Buffalo to New York by canal.		
	Chicago Board of Trade.	Buffalo Chamber of Commerce.	New York Produce Exchange.	Mean.	Buffalo Chamber of Commerce.	New York Produce Exchange.	Mean.
	Cents.	*Cents.*	*Cents.*	*Cents.*	*Cents.*	*Cents.*	*Cents.*
1891	2.4	2.4	2.4	2.4	3.5	3.6	3.6
1892	2.3	2.2	2.2	2.2	3.5	3.4	3.4
1893	1.7	1.6	1.7	1.7	4.6	4.6	4.6
1894	1.4	1.2	1.3	1.3	3.2	3.2	3.2
1895	1.8	1.9	1.9	1.9	2.2	2.2	2.2
1896	1.6	1.7	1.6	1.6	3.7	3.8	3.8
1897	1.6	1.5	1.5	1.5	2.8	2.8	2.8
1898	1.6	1.5	1.6	1.6	2.8	2.9	2.8
1899	2.8	2.5	2.7	2.7	3.0	2.9	3.0
1900	....	1.8	1.9	1.8	2.5	2.5	2.5
1901	1.6	1.6	1.6	1.6	3.5	3.5	3.5
1902	1.5	1.5	1.5	1.5	3.8	3.8	3.8
1903	1.5	1.4	1.4	1.4	4.0	4.0	4.0
1904	1.7	1.5	1.5	1.6	3.2	3.2	3.2
1905	1.7	1.7	1.7	1.7	3.9	3.9	3.9
1906	1.7	1.7	1.7	1.7	4.2	4.2	4.2
1907	1.6	1.5	1.6	1.6	5.0	5.1	5.0
1908	1.1	1.1	1.0	1.1	5.0	5.0	5.0
1909	1.4	1.5	1.4	1.4	3.9	4.0	4.0

RANGE OF LAKE RATES.

According to Table 49, it would appear that the difference between the highest and lowest rates on wheat to Buffalo from western ports was subject to less variation since about 1896 than before that time. In 1891 rates from Duluth ranged from 1¼ to 9½ cents per bushel, and in 1894 rates from Chicago ranged from seven-eighths of 1 cent to 3 cents per bushel.

The relatively slight variation in rates on account of distance will be noted. While Duluth is not much farther from Buffalo than is Chicago, yet both are hundreds of miles farther away than is Toledo. The minimum rates from Toledo to Buffalo have for a number of years been about the same as from Duluth and Chicago to Buffalo, while the maximum rates from Toledo have in some years—for instance, in 1902 and 1905—been but slightly below Chicago, while in 1908 the maximum rates from both ports were the same. The highest rate to Buffalo from Duluth, however, has always exceeded that from Toledo by a large amount, one of the smallest differences being in 1902, when the highest rate quoted to Buffalo on wheat from Duluth was 2¼ cents and from Toledo 2 cents per bushel.

TABLE 49.—*Lowest and highest freight rates per bushel on wheat by lake to Buffalo from Toledo, Duluth, and Chicago, 1882–1909.*[a]

Year.	To Buffalo from—					
	Toledo.		Duluth.		Chicago.[b]	
	Lowest.	Highest.	Lowest.	Highest.	Lowest.	Highest.
	Cents.	*Cents.*	*Cents.*	*Cents.*	*Cents.*	*Cents.*
1882					1.50	3.50
1883					2.20	5.25
1884					1.60	3.00
1885			1.50	5.00	1.10	3.75
1886	1.75	3.00	3.25	8.00	2.00	5.875
1887	2.25	3.00	5.00	8.00	3.00	6.00
1888	1.50	2.125	2.00	5.00	1.70	4.00
1889	1.75	2.00	2.00	5.00	2.00	3.60
1890	1.50	2.00	2.00	5.00	1.50	2.50
1891	1.00	3.00	1.25	9.50	1.00	5.25
1892	1.50	2.50	2.25	4.00	1.00	3.00
1893	1.00	2.00	1.25	3.50	1.00	2.75
1894	1.00	2.00	1.25	3.00	.875	3.00
1895	1.00	2.25	2.00	6.00	1.00	3.00
1896	1.25	1.75	1.25	3.00	1.25	2.625
1897	1.00	1.25	1.00	2.50	1.00	2.625
1898	1.00	1.50	1.00	3.50	1.25	3.25
1899	1.50	2.00	2.50	6.00	1.875	3.75
1900	1.25	2.00	1.50	3.75	1.25	3.00
1901	1.25	1.50	1.125	3.75	1.25	2.50
1902	1.125	2.00	1.00	2.25	1.375	2.125
1903	1.125	1.50	1.125	2.75	1.25	2.25
1904	1.00	1.75	1.00	5.00	1.00	3.00
1905	1.125	2.50	1.25	4.00	1.125	3.00
1906	1.375	1.50	1.75	3.00	1.375	2.125
1907	1.00	1.50	1.00	2.50	1.125	2.00
1908	1.00	1.50	1.00	3.50	.75	1.50
1909	1.00	1.50			1.1	2.0

[a] Compiled from annual reports of the Buffalo Merchants' Exchange and Buffalo Chamber of Commerce, except figures for Toledo, 1905–1909, which were supplied by the secretary of the Toledo Produce Exchange.
[b] Highest rates from Chicago to Buffalo: 1871, 16.6; 1872, 16.9; 1873, 12.3; 1874, 5.4; 1875, 6; 1876, 4.5; 1877, 5.7; 1878, 6.9; 1879, 8.5; 1880, 8.5; and 1881, 5.25 cents per bushel. Rates for 1871–1878, inclusive, were reduced to gold basis from the currency values given in the original.

COMPARISON OF RATES TO POINTS EAST AND WEST OF NIAGARA RIVER.

In the earlier years shown in Table 50 rates by lake to Buffalo from Chicago have been lower than to points east of Niagara River. Rates to Buffalo, however, have declined since 1871–1875 to a much greater degree than have rates to points east of the river—Ogdensburg and Montreal, for instance. The average rate from Chicago to Ogdensburg in 1890, 1892, and 1893, the first years for which quotations are available, were 3.4 cents per bushel, and in 1906–1909 4 cents per bushel, a slight increase, while to Montreal the average for 1883–1885 was 6.8 cents, and in 1906–1909 5.4 cents, a slight reduction.

Compared with Buffalo and Depot Harbor, the rates on wheat to Ogdensburg and Montreal from Chicago during 1901–1905 were from two to three times as great, while during 1906–1909 the mean of the rates to Ogdensburg and Montreal were three and one-fourth times

those to Buffalo and Depot Harbor. The big boats drawing, when loaded, 18 feet or more of water were not able to pass through Welland Canal, and had to give the advantage of their cheap service to ports east of Niagara.

TABLE 50.—*Mean annual freight rates on wheat per bushel by lake from Chicago to ports west and east of Niagara River, 1871–1909.*[a]

[All values are gold.]

Year.	West of Niagara River.		East of Niagara River.		
	Buffalo.[b]	Depot Harbor.	Kingston.	Ogdensburg.	Montreal.
Mean:	*Cents.*	*Cents.*	*Cents.*	*Cents.*	*Cents.*
1871–1875	6.4	....	10.4	....	....
1876–1880	4.0	....	7.1	....	....
1881–1885	2.8	....	5.2	....	[c]6.8
1886–1890	3.1	....	[d]5.9	....	[e]7.5
1891–1895	2.0	....	[f]3.3	[g]3.4	[h]5.6
1896–1900	1.9	....	3.0	[i]3.4	[j]5.2
1901–1905	1.6	1.6	....	[k]3.7	[l]4.9
1906–1908	1.4	1.5	....	4.0	5.4
1906	1.7	1.7	....	4.0	6.7
1907	1.6	1.6	....	4.2	5.6
1908	1.1	1.2	....	4.1	5.5
1909	1.4	1.4	....	3.7	4.0

[a] Compiled from weekly quotations in annual reports of the Chicago Board of Trade.
[b] Mean rates to Buffalo from Chicago by sail vessels were: 1871–1875, 6.4 cents; 1876–1880, 4.1; 1881–1885, 3; and by steam vessels: 1871–1875, 6.3 cents; 1876–1880, 4; 1881–1885, 2.7 cents per bushel. For later years, mean rates by sail, when given, were practically the same as by steam vessels.
[c] Average, 1883–1885.
[d] Average, 1886, 1887, 1890.
[e] Average, 1886–1889.
[f] Average, 1891–1894.
[g] Average, 1890, 1892, 1893.
[h] Average, 1891, 1892, 1894, 1895.
[i] Average, 1898–1900.
[j] Average, 1896–1898.
[k] Average, 1900, 1903, 1905.
[l] 1903 only.

RATES BY WAY OF BUFFALO AND OSWEGO COMPARED.

A comparison of the freight rates on wheat from Chicago to New York by water over two routes is shown in Table 51. It will be noted that the figures are taken from a single authority which, while it agrees for all practical purposes with other authorities, is nevertheless slightly different in some instances from corresponding data in other tables of this bulletin.

According to the figures in Table 51 the freight rates by way of Oswego were regularly higher than by way of Buffalo, due to the lake rate to Oswego being higher than that to Buffalo. The rate to New York by canal was less from Oswego than from Buffalo. Owing to the relative insignificance of this route for the grain trade in later years, rates have not been quoted by way of Oswego subsequent to 1892.

TABLE 51.—*Mean freight rates per bushel on wheat by lake and canal from Chicago to New York via Buffalo and Oswego, 1871–1895.*[a]

[All values are gold.]

Year.	Via Buffalo.			Via Oswego.		
	Chicago to Buffalo by lake.	Buffalo to New York by canal.	Total.	Chicago to Oswego by lake.	Oswego to New York by canal.	Total.
Mean:	*Cents.*	*Cents.*	*Cents.*	*Cents.*	*Cents.*	*Cents.*
1871–1875	6.05	9.82	15.87	10.30	6.98	17.27
1876–1880	3.94	6.51	10.45	6.91	5.10	12.01
1881–1885	2.71	4.62	7.33	5.14	3.62	8.75
1886–1890	2.97	4.21	7.18	[b] 6.27	[b] 3.92	[b] 10.20
1891–1895	1.88	3.40	5.29	....	[c] 3.25	....
1871	6.82	11.29	18.11	11.05	7.98	19.03
1872	10.15	11.58	[d] 21.73	15.26	8.00	23.26
1873	6.70	10.17	16.87	12.48	7.04	19.52
1874	3.62	9.09	12.71	6.81	6.58	13.39
1875	2.98	6.97	9.95	5.88	5.29	11.17
1876	2.60	6.00	8.60	5.82	5.00	10.82
1877	3.55	7.17	10.72	7.05	5.59	12.64
1878	3.05	6.03	9.08	5.21	3.76	8.97
1879	4.74	6.86	11.60	7.41	5.67	13.08
1880	5.76	6.51	12.27	9.06	5.46	14.52
1881	3.44	4.75	8.19	6.58	4.20	10.78
1882	2.50	5.39	7.89	5.37	4.68	10.05
1883	3.41	4.96	8.37	6.54	3.51	10.05
1884	2.18	4.13	6.31	4.03	2.34	6.37
1885	2.02	3.85	5.87	3.17	3.35	6.52
1886	3.68	5.03	8.71	5.90	4.57	[e] 10.47
1887	4.13	4.38	8.51	7.64	4.09	11.73
1888	2.56	3.37	5.93	....	3.32	....
1889	2.51	4.38	6.89	5.87	3.69	[f] 9.56
1890	1.96	3.89	5.85	5.68	3.34	9.02
1891	2.38	3.58	5.96	....	3.32	....
1892	2.19	3.42	5.61	....	3.17	....
1893	1.66	4.65	[g] 6.31	....	....	....
1894	1.27	3.17	4.44	....	....	....
1895	1.92	2.19	4.11	....	....	....

[a] Compiled from annual reports of the New York Produce Exchange.
[b] Average, 1886, 1887, 1889, and 1890.
[c] Average, 1891 and 1892.
[d] Given in original as 24.47 cents currency (21.78 cents gold).
[e] Given in original as 10.41 cents.
[f] Given in original as 9.65 cents.
[g] Given in original as 6.32 cents.

ROUTES OF GRAIN TRAFFIC.

WESTERN AND EASTERN MILLS.

There are three principal ways in which the grain grown in the Great Lakes region, as well as in the country south of it, is marketed. First, it may be sold to mills in the region where it is produced. The largest milling center in the United States is Minneapolis. The extent of the market here is indicated by the quantity of wheat used by the local mills. The average receipts of wheat at this market for the three years ending with 1909 were 86,000,000 bushels and the average shipments 20,000,000 bushels, leaving 66,000,000 bushels of wheat retained for the use of the mills. A second group of markets

open for the wheat of the Great Lakes region are the milling plants in New York and other eastern cities.

Owing partly to a low freight rate on grain, which at times is only 1 cent a bushel from Chicago or Duluth to Buffalo, a large amount of western wheat is ground in the Eastern States.

EXPORT MOVEMENTS.

A third class of markets consists of those in foreign countries. Exports of grain grown east of the Rocky Mountains are made through three principal groups of seaports; one group includes five ports on the Atlantic, the second comprises three on the Gulf coast, and the third is composed of at least four important lake ports through which foreign shipments are made. The principal Atlantic grain ports are Portland (Me.), Boston, New York, Philadelphia, and Baltimore; the leading ones on the Gulf coast are New Orleans, Galveston, and Port Arthur; and the principal lake ports, through which grain is forwarded to Canada for reshipment to other foreign countries, are Duluth, Superior, Chicago, and Detroit.

In addition to the trade at these ports there are minor shipments from a number of others.

From the country shipping points to which the farmers haul their grain, a part of it is sent to primary markets such as Chicago, Minneapolis, or Duluth. There are a number of different routes over which grain from these primary markets is carried to seaports or to eastern mills. The lake routes from Duluth and Chicago have been mentioned on previous pages of this bulletin, and reference has also been made to all-rail shipments and to the rail-and-canal movement, through Buffalo to the seaboard. Lake-and-rail routes terminate also at other north Atlantic ports besides New York, the transfer from lake to rail being made at eastern ports of Lake Erie, and even as far east as Ogdensburg on the St. Lawrence River.

In addition to the shipments eastward and across the Canadian border, an important outlet for the grain grown in the Great Lakes region, especially in the southern part of it, has been opened toward the south, and a large part of the traffic is thus diverted through the Gulf ports. While these southern ports depend principally upon the regions south and southwest of the grain country which is tributary to the lakes, nevertheless the transportation lines which extend westward from the Atlantic coast feel the competition of the north-and-south roads which supply the Gulf ports.

TRANSIT TRADE.

There is also a movement from Canada across the border into North Dakota and neighboring States. This grain is brought southward over branches of a railroad whose main line is in the United

States and is carried eastward to such points as Duluth, for reshipment through Canadian ports to distant markets. It is transported in bond, so that no duty is paid on it when it enters the United States, or when it reenters Canada. Other routes over which bonded grain is carried from Canada enter the United States at points on the northeastern boundary and terminate principally at Portland (Me.), Boston, and New York, at which points transfer is made to ocean vessels.

METHODS OF MARKETING.

SALES BY FARMERS.

In the Great Lakes region, as in other parts of the United States, grain is sold by the farmer to a dealer or his agent at a near-by shipping point. In such sales the terms are cash. Throughout Minnesota and North Dakota a large number of cooperative elevators have been established, through which farmers are enabled to sell their grain direct to purchasers at such terminal markets as Duluth and Minneapolis. The manager of the elevator, as the representative of the farmers who make up the association, frequently sells through commission men at the terminal market.

From the elevators at these country shipping stations grain is sent direct to the primary markets, where it is sold frequently, if not generally, through commission men to millers, exporters, and other buyers. At the terminal markets are also headquarters of what are known as elevator lines. These lines own or control large numbers of country elevators. The agents who represent the elevator lines at the country stations buy direct from farmers, thus eliminating the commission man from their transactions.

TRANSACTIONS AT PRIMARY MARKETS.

The country dealer who sells through commission men frequently collects a large part of the value of a car of grain soon after it is loaded. He makes a draft on the commission man to whom the car is consigned, attaches the draft to a bill of lading and gets the set of papers, thus made up, cashed at a bank. These drafts may be honored by the commission men on whom they are drawn a number of days before the consignment is received by them. These advances, according to the rules of the Board of Trade at Duluth, as at other places, must bear interest. After the consignment of grain is sold, the commission man deducts from the proceeds the freight charges, his commission, fees for weighing and inspecting, and other expenses, which include any advances that he may have made by cashing drafts, and remits the balance to the shipper. It is customary for the weight and the quality of the grain sold by the country shipper to be determined at the terminal market.

GRADING.

Grading at terminal markets is done either by a board of trade, or, as in Illinois and Minnesota, by state officials. In determining the grade of grain received or shipped by rail, the unit of quantity is a carload, except where a car is divided by a partition and contains two different kinds of grain. In many places it is the custom for the inspector to go from car to car, taking samples and determining grades at the same time. He makes a record which identifies the car and gives the grade which he has assigned to it, and takes a sample with him from each car. Provision is made for an appeal from the decision as made by the inspector.

A method adopted by the state inspectors of Minnesota and Illinois consists in having a force of samplers distinct from the inspectors. The samplers go from car to car, taking representative lots of grain and marking each sample with the number of the car and the road to which it belongs. These samples are sent to the office of the inspector where grades are determined and records made. Certificates are issued by the state inspectors which show the grade of each consignment of grain inspected and received into public elevators. These elevator certificates are negotiable and are exchanged as evidences of transfer of ownership when the grain they represent is bought and sold. When a given lot is delivered from an elevator, the certificate representing it is canceled and a new certificate, showing the grade and quantity as determined when the delivery is made, is given to the shipper.

In Minnesota the State appoints the official weighmasters at the terminal markets of Duluth and Minneapolis. At a number of other large centers the weighmaster is an official of the board of trade. The weights, as certified by the weighmaster, are those according to which sales are made.

SALES BY SAMPLE.

One of the largest cash grain markets in the United States is Minneapolis. Here much grain is sold by sample, although the grade as authoritatively fixed may enter into the transaction. When a sale is made on the basis of a sample the purchaser takes one-half of the sample and the seller retains the other. In this connection it is worth noting that in addition to the state samplers and inspectors, there are at Minneapolis private samplers who are authorized by the Chamber of Commerce to furnish samples from the various cars received to members of the Chamber of Commerce who may desire the samples. Selling by sample is also common in cash transactions at other markets, and the tables containing samples are part of the usual furnishings of the "floor" of a board of trade.

CLASSES OF ELEVATORS.

Elevators may be roughly divided into private and public, the former being used for grain belonging to the owners of the elevator, and the public ones being owned by persons other than those who use them. Boards of trade make rules determining what is a "regular" elevator, so that dealers may know those houses in which grain may be stored and recognized as formally on the market. When a seller contracts to deliver a given quantity of wheat at Duluth, he knows that the board of trade will regard the delivery as made when the wheat is placed in a regular elevator.

Grain which is shipped via Duluth in bond, from one Canadian point to another, is at that city unloaded from the cars into elevators under the supervision of customs officials. The bin, if not the entire elevator, into which the bonded grain is received is locked and kept under the control of these officials.

EXPORTERS.

Exporters have in a number of cases extended their business to such primary markets as Duluth and Chicago where they buy grain from commission men and other members of the boards of trade. A well-organized firm of exporters will have its agents along the various transportation routes and in Europe. European representatives will make sales, while transportation agents along various routes will report on conditions that affect freight rates and service, in order that the firm may know which route for the time being is the cheapest and best.

HOW GRAIN IS HANDLED IN TRANSIT.

HAULING IN WAGONS.

The grain crop of the Great Lakes region, as of most other parts of the United States east of the Rocky Mountains, is handled in bulk. The farmer regularly hauls his grain to the local shipping point without the use of sacks, and it is by no means uncommon for the grain to be loaded into the wagon bed directly from the thrashing machine and hauled at once to the local shipping point. Here are usually scales which are used to dump the wagon after the load is weighed. In using these appliances the end gate is taken out, the wagon tilted backward, and the contents dumped into a pit, whence they are carried by mechanical conveyors to the bins of the elevator.

At some points farmers combine their produce to load a car directly from wagons and sell the grain in a distant market in preference to the one afforded by the neighboring elevator. Throughout the North Central States two horses are the usual number for a wagon,

and the usual load of grain is approximately one-twentieth of a carload. According to data gathered in 1906 through correspondents of the Bureau of Statistics of the Department of Agriculture, the average loads actually hauled in the North Central States were 3,077 pounds of wheat, 2,758 pounds of corn, 2,766 pounds of oats, 2,977 pounds of barley, and 2,676 pounds of rye.

ELEVATORS.

The country elevator, which receives the grain from the farmer, loads it into a railroad car through spouts which are supplied from the bins either directly through force of gravity or by belt conveyors. At the terminal elevators where the car is unloaded the grain is taken out by means of large scoops pulled by machinery but placed in position and guided by hand. It is common for the grain to be received from the car through a grating into a pit at the bottom of which are belt conveyors. From the pit the grain is carried to the top of the elevator, where it is weighed in large scales holding possibly 500 bushels each. After being weighed the grain is transferred to the bins below, from which it may again be taken by gravity or by moving belts to other parts of the elevator or to the chutes through which it is delivered to cars or vessels.

In order to increase the storage capacity it is a common practice to build large tanks holding perhaps 60,000 to 80,000 or even more bushels each. These tanks are located alongside of the "working house," as the main elevator is called, and are filled from the top by a belt conveyor and emptied from the bottom by a similar arrangement.

In addition to serving as a place of storage and as means of transfer for grain the elevator is also used both to clean grain and to mix different kinds, or rather different grades of the same kind.

CARS AND VESSELS.

When a car is to be used for grain, boards are placed across the doorway, forming a barrier as high as grain is to be loaded inside. When ready to load, the car is hauled alongside the elevator and a spout put through the door above the top of the boards. Meanwhile the grain, having been carried up to the scales, is delivered through the spout into the car. The time required to fill a car, if conditions are favorable, is very short; the average for a number of cars, as observed in Buffalo in June, 1909, was ten minutes each, including the time required to move one car out of and another into position under the elevator spout. The moving was done by means of a cable operated by machinery in the elevator. The actual time required for the contents of an elevator bin of about 500 bushels

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to discharge into a car was from two to three minutes. These cars were loading with corn and there was no difficulty in putting the required amount within the space afforded; but, on the same day a car was loaded with oats weighing, it was said, only about 28 pounds per measured bushel, and as 1,700 bushels of 32 pounds each were to be shipped much difficulty was experienced. When the space at the car door was nearly full the stream from the scales was stopped and the pile of grain shoveled back toward the ends of the car and piled up toward the roof. This tedious process extended the time of loading to about one hour and a half.

When loading a vessel at western lake ports, as Chicago or Duluth, a number of spouts or legs may be used, one for each of a number of hatchways of the vessel. When a car or vessel is being loaded at such markets inspectors watch closely the condition of the grain as it passes from the elevator. Occasionally loading will be delayed on account of the inspectors requiring the elevator superintendent to stop delivering grain until it is cleaned sufficiently to be classed with the grade to which it is claimed to belong.

After some grain has been run into the hold of a vessel it is leveled off by men using shovels. This process, called trimming, is practiced on ocean vessels and canal boats as well as on the lake carriers.

In loading canal boats at elevators but little trimming is required when a device is used for directing the stream of grain from the elevator spout into the various corners and irregular spaces of the hold. It takes about an hour under ordinary conditions to load a canal boat with grain, the load amounting to about 8,000 bushels.

Lake vessels are unloaded at Buffalo by means of spouts or "marine legs" which are let down into the hold and through which the grain is drawn up into the elevator. Scoops pulled by mechanical power and guided by hand are used to move the grain from different parts of the hold to the marine leg.

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RECENT PUBLICATIONS OF THE BUREAU OF STATISTICS.

BULLETINS.

[To be procured, at the prices indicated, from the Superintendent of Documents, Government Printing Office, Washington, D. C.]

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